
Blender Index

Release 2.60.4 - API

Blender Foundation

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CONTENTS

Welcome, this document is an API reference for Blender 2.60.4. built Unknown.

A PDF version of this document is also available

BLENDER/PYTHON DOCUMENTATION

1.1 Quickstart Introduction

1.1.1 Intro

This API is generally stable but some areas are still being added and improved.

The Blender/Python API can do the following:

- Edit any data the user interface can (Scenes, Meshes, Particles etc.)
- Modify user preferences, keymaps and themes
- Run tools with own settings
- Create user interface elements such as menus, headers and panels
- Create new tools
- Create interactive tools
- Create new rendering engines that integrate with Blender
- Define new settings in existing Blender data
- Draw in the 3D view using OpenGL commands from Python

The Blender/Python API **can't** (yet)...

- Create new space types.
- Assign custom properties to every type.
- Define callbacks or listeners to be notified when data is changed.

1.1.2 Before Starting

This document isn't intended to fully cover each topic. Rather, its purpose is to familiarize you with Blender 2.5's new Python API.

A quick list of helpful things to know before starting:

- Blender uses Python 3.x; some 3rd party extensions are not available yet.
- The interactive console in Blender 2.5 has been improved; testing one-liners in the console is a good way to learn.
- Button tool tips show Python attributes and operator names.

- Right clicking on buttons and menu items directly links to API documentation.
- For more examples, the text menu has a templates section where some example operators can be found.
- To examine further scripts distributed with Blender, see `~/ .blender/scripts/startup/bl_ui` for the user interface and `~/ .blender/scripts/startup/bl_op` for operators.

1.1.3 Key Concepts

Data Access

Accessing datablocks

Python accesses Blender's data in the same way as the animation system and user interface; this implies that any setting that can be changed via a button can also be changed from Python.

Accessing data from the currently loaded blend file is done with the module `bpy.data`. This gives access to library data. For example:

```
>>> bpy.data.objects
<bpy_collection[3], BlendDataObjects>

>>> bpy.data.scenes
<bpy_collection[1], BlendDataScenes>

>>> bpy.data.materials
<bpy_collection[1], BlendDataMaterials>
```

About Collections

You'll notice that an index as well as a string can be used to access members of the collection.

Unlike Python's dictionaries, both methods are acceptable; however, the index of a member may change while running Blender.

```
>>> list(bpy.data.objects)
[bpy.data.objects["Cube"], bpy.data.objects["Plane"]]

>>> bpy.data.objects['Cube']
bpy.data.objects["Cube"]

>>> bpy.data.objects[0]
bpy.data.objects["Cube"]
```

Accessing attributes

Once you have a data block, such as a material, object, groups etc., its attributes can be accessed much like you would change a setting using the graphical interface. In fact, the tooltip for each button also displays the Python attribute which can help in finding what settings to change in a script.

```
>>> bpy.data.objects[0].name
'Camera'
```



```
>>> bpy.data.scenes["Scene"]
bpy.data.scenes['Scene']

>>> bpy.data.materials.new("MyMaterial")
bpy.data.materials['MyMaterial']
```

For testing what data to access it's useful to use the “Console”, which is its own space type in Blender 2.5. This supports auto-complete, giving you a fast way to dig into different data in your file.

Example of a data path that can be quickly found via the console:

```
>>> bpy.data.scenes[0].render.resolution_percentage
100
>>> bpy.data.scenes[0].objects["Torus"].data.vertices[0].co.x
1.0
```

Custom Properties

Python can access properties on any datablock that has an ID (data that can be linked in and accessed from `bpy.data`). When assigning a property, you can make up your own names, these will be created when needed or overwritten if they exist.

This data is saved with the blend file and copied with objects.

Example:

```
bpy.context.object["MyOwnProperty"] = 42

if "SomeProp" in bpy.context.object:
    print("Property found")

# Use the get function like a python dictionary
# which can have a fallback value.
value = bpy.data.scenes["Scene"].get("test_prop", "fallback value")

# dictionaries can be assigned as long as they only use basic types.
group = bpy.data.groups.new("MyTestGroup")
group["GameSettings"] = {"foo": 10, "bar": "spam", "baz": {}}

del group["GameSettings"]
```

Note that these properties can only be assigned basic Python types.

- int, float, string
- array of ints/floats
- dictionary (only string keys are supported, values must be basic types too)

These properties are valid outside of Python. They can be animated by curves or used in driver paths.

Context

While it's useful to be able to access data directly by name or as a list, it's more common to operate on the user's selection. The context is always available from “`bpy.context`” and can be used to get the active object, scene, tool settings along with many other attributes.

Common-use cases:

```
>>> bpy.context.object
>>> bpy.context.selected_objects
>>> bpy.context.visible_bones
```

Note that the context is read-only. These values cannot be modified directly, though they may be changed by running API functions or by using the data API.

So `bpy.context.object = obj` will raise an error.

But `bpy.context.scene.objects.active = obj` will work as expected.

The context attributes change depending on where they are accessed. The 3D view has different context members than the console, so take care when accessing context attributes that the user state is known.

See [bpy.context](#) API reference

Operators (Tools)

Operators are tools generally accessed by the user from buttons, menu items or key shortcuts. From the user perspective they are a tool but Python can run these with its own settings through the `bpy.ops` module.

Examples:

```
>>> bpy.ops.mesh.flip_normals()
{'FINISHED'}
>>> bpy.ops.mesh.hide(unselected=False)
{'FINISHED'}
>>> bpy.ops.object.scale_apply()
{'FINISHED'}
```

Note: The menu item: Help -> Operator Cheat Sheet” gives a list of all operators and their default values in Python syntax, along with the generated docs. This is a good way to get an overview of all blender’s operators.

Operator Poll()

Many operators have a “poll” function which may check that the mouse is a valid area or that the object is in the correct mode (Edit Mode, Weight Paint etc). When an operator’s poll function fails within python, an exception is raised.

For example, calling `bpy.ops.view3d.render_border()` from the console raises the following error:

```
RuntimeError: Operator bpy.ops.view3d.render_border.poll() failed, context is incorrect
```

In this case the context must be the 3d view with an active camera.

To avoid using try/except clauses wherever operators are called you can call the operators own `.poll()` function to check if it can run in the current context.

```
if bpy.ops.view3d.render_border.poll():
    bpy.ops.view3d.render_border()
```

1.1.4 Integration

Python scripts can integrate with Blender in the following ways:

- By defining a rendering engine.

- By defining operators.
- By defining menus, headers and panels.
- By inserting new buttons into existing menus, headers and panels

In Python, this is done by defining a class, which is a subclass of an existing type.

Example Operator

```
import bpy

def main(context):
    for ob in context.scene.objects:
        print(ob)

class SimpleOperator(bpy.types.Operator):
    '''Tooltip'''
    bl_idname = "object.simple_operator"
    bl_label = "Simple Object Operator"

    @classmethod
    def poll(cls, context):
        return context.active_object is not None

    def execute(self, context):
        main(context)
        return {'FINISHED'}

def register():
    bpy.utils.register_class(SimpleOperator)

def unregister():
    bpy.utils.unregister_class(SimpleOperator)

if __name__ == "__main__":
    register()

    # test call
    bpy.ops.object.simple_operator()
```

Once this script runs, `SimpleOperator` is registered with Blender and can be called from the operator search popup or added to the toolbar.

To run the script:

1. Highlight the above code then press Ctrl+C to copy it.
2. Start Blender
3. Press Ctrl+Right twice to change to the Scripting layout.
4. Click the button labeled `New` and the confirmation pop up in order to create a new text block.
5. Press Ctrl+V to paste the code into the text panel (the upper left frame).

6. Click on the button **Run Script**.
7. Move your mouse into the 3D view, press spacebar for the operator search menu, and type “Simple”.
8. Click on the “Simple Operator” item found in search.

See Also:

The class members with the **bl_** prefix are documented in the API reference `bpy.types.Operator`

Note: The output from the `main` function is sent to the terminal; in order to see this, be sure to *use the terminal*.

Example Panel

Panels register themselves as a class, like an operator. Notice the extra **bl_** variables used to set the context they display in.

```
import bpy

class HelloWorldPanel(bpy.types.Panel):
    bl_label = "Hello World Panel"
    bl_idname = "OBJECT_PT_hello"
    bl_space_type = "PROPERTIES"
    bl_region_type = "WINDOW"
    bl_context = "object"

    def draw(self, context):
        layout = self.layout

        obj = context.object

        row = layout.row()
        row.label(text="Hello world!", icon='WORLD_DATA')

        row = layout.row()
        row.label(text="Active object is: " + obj.name)
        row = layout.row()
        row.prop(obj, "name")

def register():
    bpy.utils.register_class(HelloWorldPanel)

def unregister():
    bpy.utils.unregister_class(HelloWorldPanel)

if __name__ == "__main__":
    register()
```

To run the script:

1. Highlight the above code then press Ctrl+C to copy it
2. Start Blender
3. Press Ctrl+Right twice to change to the Scripting layout

4. Click the button labeled `New` and the confirmation pop up in order to create a new text block.
5. Press `Ctrl+V` to paste the code into the text panel (the upper left frame)
6. Click on the button **Run Script**.

To view the results:

1. Select the the default cube.
2. Click on the Object properties icon in the buttons panel (far right; appears as a tiny cube).
3. Scroll down to see a panel named **Hello World Panel**.
4. Changing the object name also updates **Hello World Panel's** Name: field.

Note the row distribution and the label and properties that are available through the code.

See Also:

`bpy.types.Panel`

1.1.5 Types

Blender defines a number of Python types but also uses Python native types.

Blender's Python API can be split up into 3 categories.

Native Types

In simple cases returning a number or a string as a custom type would be cumbersome, so these are accessed as normal python types.

- blender float/int/boolean -> float/int/boolean
- blender enumerator -> string

```
>>> C.object.rotation_mode = 'AXIS_ANGLE'
```

- blender enumerator (multiple) -> set of strings

```
# setting multiple camera overlay guides
bpy.context.scene.camera.data.show_guide = {'GOLDEN', 'CENTER'}
```

```
# passing as an operator argument for report types
self.report({'WARNING', 'INFO'}, "Some message!")
```

Internal Types

Used for Blender datablocks and collections: `bpy.types.bpy_struct`

For data that contains its own attributes groups/meshes/bones/scenes... etc.

There are 2 main types that wrap Blenders data, one for datablocks (known internally as `bpy_struct`), another for properties.

```
>>> bpy.context.object
bpy.data.objects['Cube']
```

```
>>> C.scene.objects
bpy.data.scenes['Scene'].objects
```

Note that these types reference Blender's data so modifying them is immediately visible.

Mathutils Types

Used for vectors, quaternion, eulers, matrix and color types, accessible from `mathutils`

Some attributes such as `bpy.types.Object.location`, `bpy.types.PoseBone.rotation_euler` and `bpy.types.Scene.cursor_location` can be accessed as special math types which can be used together and manipulated in various useful ways.

Example of a matrix, vector multiplication:

```
bpy.context.object.matrix_world * bpy.context.object.data.verts[0].co
```

Note: mathutils types keep a reference to Blender's internal data so changes can be applied back.

Example:

```
# modifies the Z axis in place.
bpy.context.object.location.z += 2.0

# location variable holds a reference to the object too.
location = bpy.context.object.location
location *= 2.0

# Copying the value drops the reference so the value can be passed to
# functions and modified without unwanted side effects.
location = bpy.context.object.location.copy()
```

1.1.6 Animation

There are 2 ways to add keyframes through Python.

The first is through key properties directly, which is similar to inserting a keyframe from the button as a user. You can also manually create the curves and keyframe data, then set the path to the property. Here are examples of both methods.

Both examples insert a keyframe on the active object's Z axis.

Simple example:

```
obj = bpy.context.object
obj.location[2] = 0.0
obj.keyframe_insert(data_path="location", frame=10.0, index=2)
obj.location[2] = 1.0
obj.keyframe_insert(data_path="location", frame=20.0, index=2)
```

Using Low-Level Functions:

```
obj = bpy.context.object
obj.animation_data_create()
obj.animation_data.action = bpy.data.actions.new(name="MyAction")
fcu_z = obj.animation_data.action.fcurves.new(data_path="location", index=2)
fcu_z.keyframe_points.add(2)
fcu_z.keyframe_points[0].co = 10.0, 0.0
fcu_z.keyframe_points[1].co = 20.0, 1.0
```

1.2 Python API Overview

This document is to give an understanding of how python and blender fit together, covering some of the functionality that isn't obvious from reading the API reference and example scripts.

1.2.1 Python in Blender

Blender embeds a python interpreter which is started with blender and stays active. This interpreter runs scripts to draw the user interface and is used for some of Blender's internal tools too.

This is a typical python environment so tutorials on how to write python scripts will work running the scripts in blender too. Blender provides the `bpy` module to the python interpreter. This module can be imported in a script and gives access to blender data, classes, and functions. Scripts that deal with blender data will need to import this module.

Here is a simple example of moving a vertex of the object named **Cube**:

```
import bpy
bpy.data.objects["Cube"].data.vertices[0].co.x += 1.0
```

This modifies Blender's internal data directly. When you run this in the interactive console you will see the 3D viewport update.

1.2.2 The Default Environment

When developing your own scripts it may help to understand how blender sets up its python environment. Many python scripts come bundled with blender and can be used as a reference because they use the same API that script authors write tools in. Typical usage for scripts include: user interface, import/export, scene manipulation, automation, defining your own toolset and customization.

On startup blender scans the `scripts/startup/` directory for python modules and imports them. The exact location of this directory depends on your installation. [See the directory layout docs](#)

1.2.3 Script Loading

This may seem obvious but it's important to note the difference between executing a script directly or importing it as a module.

Scripts that extend blender - define classes that exist beyond the scripts execution, this makes future access to these classes (to unregister for example) more difficult than importing as a module where class instance is kept in the module and can be accessed by importing that module later on.

For this reason it's preferable to only use directly execute scripts that don't extend blender by registering classes.

Here are some ways to run scripts directly in blender.

- Loaded in the text editor and press **Run Script**.
- Typed or pasted into the interactive console.
- Execute a python file from the command line with blender, eg:

```
blender --python /home/me/my_script.py
```

To run as modules:

- The obvious way, `import some_module` command from the text window or interactive console.
- Open as a text block and tick "Register" option, this will load with the blend file.

- copy into one of the directories `scripts/startup`, where they will be automatically imported on startup.
- define as an addon, enabling the addon will load it as a python module.

Addons

Some of blenders functionality is best kept optional, alongside scripts loaded at startup we have addons which are kept in their own directory `scripts/addons`, and only load on startup if selected from the user preferences.

The only difference between addons and built-in python modules is that addons must contain a `bl_info` variable which blender uses to read metadata such as name, author, category and URL.

The user preferences addon listing uses `bl_info` to display information about each addon.

See [Addons](#) for details on the `bl_info` dictionary.

1.2.4 Integration through Classes

Running python scripts in the text editor is useful for testing but you'll want to extend blender to make tools accessible like other built-in functionality.

The blender python api allows integration for:

- `bpy.types.Panel`
- `bpy.types.Menu`
- `bpy.types.Operator`
- `bpy.types.PropertyGroup`
- `bpy.types.KeyingSet`
- `bpy.types.RenderEngine`

This is intentionally limited. Currently, for more advanced features such as mesh modifiers, object types, or shader nodes, C/C++ must be used.

For python intergration Blender defines methods which are common to all types. This works by creating a python subclass of a Blender class which contains variables and functions specified by the parent class which are pre-defined to interface with Blender.

For example:

```
import bpy
class SimpleOperator(bpy.types.Operator):
    bl_idname = "object.simple_operator"
    bl_label = "Tool Name"

    def execute(self, context):
        print("Hello World")
        return {'FINISHED' }
```

```
bpy.utils.register_class(SimpleOperator)
```

First note that we subclass a member of `bpy.types`, this is common for all classes which can be integrated with blender and used so we know if this is an Operator and not a Panel when registering.

Both class properties start with a `bl_` prefix. This is a convention used to distinguish blender properties from those you add yourself.

Next see the execute function, which takes an instance of the operator and the current context. A common prefix is not used for functions.

Lastly the register function is called, this takes the class and loads it into blender. See [Class Registration](#).

Regarding inheritance, blender doesn't impose restrictions on the kinds of class inheritance used, the registration checks will use attributes and functions defined in parent classes.

class mix-in example:

```
import bpy
class BaseOperator:
    def execute(self, context):
        print("Hello World BaseClass")
        return {'FINISHED'}

class SimpleOperator(bpy.types.Operator, BaseOperator):
    bl_idname = "object.simple_operator"
    bl_label = "Tool Name"

bpy.utils.register_class(SimpleOperator)
```

Notice these classes don't define an `__init__(self)` function. While `__init__()` and `__del__()` will be called if defined, the class instances lifetime only spans the execution. So a panel for example will have a new instance for every redraw, for this reason there is rarely a cause to store variables in the panel instance. Instead, persistent variables should be stored in Blenders data so that the state can be restored when blender is restarted.

Note: Modal operators are an exception, keeping their instance variable as blender runs, see modal operator template.

So once the class is registered with blender, instancing the class and calling the functions is left up to blender. In fact you cannot instance these classes from the script as you would expect with most python API's.

To run operators you can call them through the operator api, eg:

```
import bpy
bpy.ops.object.simple_operator()
```

User interface classes are given a context in which to draw, buttons window, file header, toolbar etc, then they are drawn when that area is displayed so they are never called by python scripts directly.

1.2.5 Registration

Module Registration

Blender modules loaded at startup require `register()` and `unregister()` functions. These are the *only* functions that blender calls from your code, which is otherwise a regular python module.

A simple blender/python module can look like this:

```
import bpy

class SimpleOperator(bpy.types.Operator):
    """ See example above """

def register():
    bpy.utils.register_class(SimpleOperator)

def unregister():
```

```
bpy.utils.unregister_class(SimpleOperator)

if __name__ == "__main__":
    register()
```

These functions usually appear at the bottom of the script containing class registration sometimes adding menu items. You can also use them for internal purposes setting up data for your own tools but take care since register won't re-run when a new blend file is loaded.

The register/unregister calls are used so it's possible to toggle addons and reload scripts while blender runs. If the register calls were placed in the body of the script, registration would be called on import, meaning there would be no distinction between importing a module or loading its classes into blender.

This becomes problematic when a script imports classes from another module making it difficult to manage which classes are being loaded and when.

The last 2 lines are only for testing:

```
if __name__ == "__main__":
    register()
```

This allows the script to be run directly in the text editor to test changes. This `register()` call won't run when the script is imported as a module since `__main__` is reserved for direct execution.

Class Registration

Registering a class with blender results in the class definition being loaded into blender, where it becomes available alongside existing functionality.

Once this class is loaded you can access it from `bpy.types`, using the `bl_idname` rather than the classes original name.

When loading a class, blender performs sanity checks making sure all required properties and functions are found, that properties have the correct type, and that functions have the right number of arguments.

Mostly you will not need concern yourself with this but if there is a problem with the class definition it will be raised on registering:

Using the function arguments `def execute(self, context, spam)`, will raise an exception:

```
ValueError: expected Operator, SimpleOperator class "execute" function to
have 2 args, found 3
```

Using `bl_idname = 1` will raise.

```
TypeError: validating class error: Operator.bl_idname expected a string
type, not int
```

Multiple-Classes

Loading classes into blender is described above, for simple cases calling `bpy.utils.register_class` (Some-Class) is sufficient, but when there are many classes or a packages submodule has its own classes it can be tedious to list them all for registration.

For more convenient loading/unloading `bpy.utils.register_module` (module) and `bpy.utils.unregister_module` (module) functions exist.

A script which defines many of its own operators, panels menus etc. you only need to write:

```
def register():
    bpy.utils.register_module(__name__)

def unregister():
    bpy.utils.unregister_module(__name__)
```

Internally blender collects subclasses on registrable types, storing them by the module in which they are defined. By passing the module name to `bpy.utils.register_module` blender can register all classes created by this module and its submodules.

Inter Classes Dependencies

When customizing blender you may want to group your own settings together, after all, they will likely have to co-exist with other scripts. To group these properties classes need to be defined, for groups within groups or collections within groups you can find yourself having to deal with order of registration/unregistration.

Custom properties groups are themselves classes which need to be registered.

Say you want to store material settings for a custom engine.

```
# Create new property
# bpy.data.materials[0].my_custom_props.my_float
import bpy

class MyMaterialProps(bpy.types.PropertyGroup):
    my_float = bpy.props.FloatProperty()

def register():
    bpy.utils.register_class(MyMaterialProps)
    bpy.types.Material.my_custom_props = bpy.props.PointerProperty(type=MyMaterialProps)

def unregister():
    del bpy.types.Material.my_custom_props
    bpy.utils.unregister_class(MyMaterialProps)

if __name__ == "__main__":
    register()
```

Note: *The class must be registered before being used in a property, failing to do so will raise an error:*

```
ValueError: bpy_struct "Material" registration error: my_custom_props could not register
```

```
# Create new property group with a sub property
# bpy.data.materials[0].my_custom_props.sub_group.my_float
import bpy

class MyMaterialSubProps(bpy.types.PropertyGroup):
    my_float = bpy.props.FloatProperty()

class MyMaterialGroupProps(bpy.types.PropertyGroup):
    sub_group = bpy.props.PointerProperty(type=MyMaterialSubProps)

def register():
    bpy.utils.register_class(MyMaterialSubProps)
    bpy.utils.register_class(MyMaterialGroupProps)
```

```
bpy.types.Material.my_custom_props = bpy.props.PointerProperty(type=MyMaterialGroupProps)

def unregister():
    del bpy.types.Material.my_custom_props
    bpy.utils.unregister_class(MyMaterialGroupProps)
    bpy.utils.unregister_class(MyMaterialSubProps)

if __name__ == "__main__":
    register()
```

Note: *The lower most class needs to be registered first and that unregister() is a mirror of register()*

Manipulating Classes

Properties can be added and removed as blender runs, normally happens on register or unregister but for some special cases it may be useful to modify types as the script runs.

For example:

```
# add a new property to an existing type
bpy.types.Object.my_float = bpy.props.FloatProperty()
# remove
del bpy.types.Object.my_float
```

This works just as well for PropertyGroup subclasses you define yourself.

```
class MyPropGroup(bpy.types.PropertyGroup):
    pass
MyPropGroup.my_float = bpy.props.FloatProperty()
```

...this is equivalent to:

```
class MyPropGroup(bpy.types.PropertyGroup):
    my_float = bpy.props.FloatProperty()
```

Dynamic Defined-Classes (Advanced)

In some cases the specifier for data may not be in blender, renderman shader definitions for example and it may be useful to define types and remove them on the fly.

```
for i in range(10):
    idname = "object.operator_%d" % i

    def func(self, context):
        print("Hello World", self.bl_idname)
        return {'FINISHED'}

    opclass = type("DynOp%d" % i,
                  (bpy.types.Operator, ),
                  {"bl_idname": idname, "bl_label": "Test", "execute": func},
                  )
    bpy.utils.register_class(opclass)
```

Note: Notice `type()` is called to define the class. This is an alternative syntax for class creation in python, better suited to constructing classes dynamically.

Calling these operators:

```
>>> bpy.ops.object.operator_1()
Hello World OBJECT_OT_operator_1
{'FINISHED'}
```

```
>>> bpy.ops.object.operator_2()
Hello World OBJECT_OT_operator_2
{'FINISHED'}
```

1.3 Best Practice

When writing you're own scripts python is great for new developers to pick up and become productive, but you can also pick up odd habits or at least write scripts that are not easy for others to understand.

For you're own work this is of course fine, but if you want to collaborate with others or have you're work included with blender there are practices we encourage.

1.3.1 Style Conventions

For Blender 2.5 we have chosen to follow python suggested style guide to avoid mixing styles amongst our own scripts and make it easier to use python scripts from other projects.

Using our style guide for your own scripts makes it easier if you eventually want to contribute them to blender.

This style guide is known as pep8 and can be found [here](#)

A brief listing of pep8 criteria.

- camel caps for class names: `MyClass`
- all lower case underscore separated module names: `my_module`
- indentation of 4 spaces (no tabs)
- spaces around operators. `1 + 1`, not `1+1`
- only use explicit imports, (no importing `*`)
- don't use single line: `if val: body`, separate onto 2 lines instead.

As well as pep8 we have other conventions used for blender python scripts.

- Use single quotes for enums, and double quotes for strings.

Both are of course strings but in our internal API enums are unique items from a limited set. eg.

```
bpy.context.scene.render.file_format = 'PNG'
bpy.context.scene.render.filepath = "//render_out"
```

- pep8 also defines that lines should not exceed 79 characters, we felt this is too restrictive so this is optional per script.

Periodically we run checks for pep8 compliance on blender scripts, for scripts to be included in this check add this line as a comment at the top of the script.

```
# <pep8 compliant>
```

To enable line length checks use this instead.

```
# <pep8-80 compliant>
```

1.3.2 User Interface Layout

TODO: Thomas

1.3.3 Script Efficiency

List Manipulation (General Python Tips)

Searching for list items

In Python there are some handy list functions that save you having to search through the list.

Even though you're not looping on the list data **python is**, so you need to be aware of functions that will slow down your script by searching the whole list.

```
my_list.count(list_item)
my_list.index(list_item)
my_list.remove(list_item)
if list_item in my_list: ...
```

Modifying Lists

In python we can add and remove from a list, This is slower when the list length is modifier, especially at the start of the list, since all the data after the index of modification needs to be moved up or down 1 place.

The most simple way to add onto the end of the list is to use `my_list.append(list_item)` or `my_list.extend(some_list)` and the fastest way to remove an item is `my_list.pop()` or `del my_list[-1]`.

To use an index you can use `my_list.insert(index, list_item)` or `list.pop(index)` for list removal, but these are slower.

Sometimes its faster (but more memory hungry) to just rebuild the list.

Say you want to remove all triangle faces in a list.

Rather than...

```
faces = mesh.faces[:] # make a list copy of the meshes faces
f_idx = len(faces)    # Loop backwards
while f_idx:         # while the value is not 0
    f_idx -= 1

    if len(faces[f_idx].vertices) == 3:
        faces.pop(f_idx) # remove the triangle
```

It's faster to build a new list with list comprehension.

```
faces = [f for f in mesh.faces if len(f.vertices) != 3]
```

Adding List Items

If you have a list that you want to add onto another list, rather than...

```
for l in some_list:
    my_list.append(l)
```

Use...

```
my_list.extend([a, b, c...])
```

Note that insert can be used when needed, but it is slower than append especially when inserting at the start of a long list.

This example shows a very sub-optimal way of making a reversed list.

```
reverse_list = []
for list_item in some_list:
    reverse_list.insert(0, list_item)
```

Removing List Items

Use `my_list.pop(index)` rather than `my_list.remove(list_item)`

This requires you to have the index of the list item but is faster since `remove()` will search the list.

Here is an example of how to remove items in 1 loop, removing the last items first, which is faster (as explained above).

```
list_index = len(my_list)

while list_index:
    list_index -= 1
    if my_list[list_index].some_test_attribute == 1:
        my_list.pop(list_index)
```

This example shows a fast way of removing items, for use in cases where you can alter the list order without breaking the scripts functionality. This works by swapping 2 list items, so the item you remove is always last.

```
pop_index = 5

# swap so the pop_index is last.
my_list[-1], my_list[pop_index] = my_list[pop_index], my_list[-1]

# remove last item (pop_index)
my_list.pop()
```

When removing many items in a large list this can provide a good speedup.

Avoid Copying Lists

When passing a list/dictionary to a function, it is faster to have the function modify the list rather than returning a new list so python doesn't have to duplicate the list in memory.

Functions that modify a list in-place are more efficient than functions that create new lists.

This is generally slower so only use for functions when it makes sense not to modify the list in place.

```
>>> my_list = some_list_func(my_list)
```

This is generally faster since there is no re-assignment and no list duplication.

```
>>> some_list_func(vec)
```

Also note that passing a sliced list makes a copy of the list in python memory

```
>>> foobar(my_list[:])
```

If my_list was a large array containing 10000's of items, a copy could use a lot of extra memory.

Writing Strings to a File (Python General)

Here are 3 ways of joining multiple strings into 1 string for writing

This really applies to any area of your code that involves a lot of string joining.

Python's string addition, *don't use if you can help it, especially when writing data in a loop.*

```
>>> file.write(str1 + " " + str2 + " " + str3 + "\n")
```

String formatting. Use this when you're writing string data from floats and int's

```
>>> file.write("%s %s %s\n" % (str1, str2, str3))
```

Python's string joining function. To join a list of strings

```
>>> file.write(" ".join([str1, str2, str3, "\n"]))
```

join is fastest on many strings, string formatting is quite fast too (better for converting data types). String arithmetic is slowest.

Parsing Strings (Import/Exporting)

Since many file formats are ASCII, the way you parse/export strings can make a large difference in how fast your script runs.

When importing strings to make into blender there are a few ways to parse the string.

Parsing Numbers

Use `float(string)` rather than `eval(string)`, if you know the value will be an int then `int(string)`, `float()` will work for an int too but its faster to read ints with `int()`.

Checking String Start/End

If your checking the start of a string for a keyword, rather than...

```
>>> if line[0:5] == "vert ": ...
```

Use...

```
>>> if line.startswith("vert "):
```


Using `startswith()` is slightly faster (approx 5%) and also avoids a possible error with the slice length not matching the string length.

`my_string.endswith("foo_bar")` can be used for line endings too.

if your unsure whether the text is upper or lower case use lower or upper string function.

```
>>> if line.lower().startswith("vert ")
```

Use try/except Sparingly

The `try` statement useful to save time writing error checking code.

However `try` is significantly slower then an `if` since an exception has to be set each time, so avoid using `try` in areas of your code that execute in a loop and runs many times.

There are cases where using `try` is faster than checking weather the condition will raise an error, so it is worth experimenting.

Value Comparison

Python has two ways to compare values `a == b` and `a is b`, The difference is that `==` may run the objects comparison function `__cmp__()` where as `is` compares identity, that both variables reference the same item in memory.

In cases where you know you are checking for the same value which is referenced from multiple places, `is` is faster.

Time You're Code

While developing a script its good to time it to be aware of any changes in performance, this can be done simply.

```
import time
time_start = time.time()

# do something...

print("My Script Finished: %.4f sec" % time.time() - time_start)
```

1.4 Tips and Tricks

Here are various suggestions that you might find useful when writing scripts.

Some of these are just python features that scripters may not have thought to use with blender, others are blender specific.

1.4.1 Use The Terminal

When writing python scripts, it's useful to have a terminal open, this is not the built-in python console but a terminal application which is used to start blender.

There are 3 main uses for the terminal, these are:

- You can see the output of `print()` as you're script runs, which is useful to view debug info.
- The error trace-back is printed in full to the terminal which won't always generate an error popup in blender's user interface (depending on how the script is executed).

- If the script runs for too long or you accidentally enter an infinite loop, Ctrl+C in the terminal (Ctrl+Break on Windows) will quit the script early.

Note: For Linux and OSX users this means starting the terminal first, then running blender from within it. On Windows the terminal can be enabled from the help menu.

1.4.2 Show All Operators

While blender logs operators in the Info space, this only reports operators with the REGISTER option enabled so as not to flood the Info view with calls to `bpy.ops.view3d.smoothview` and `bpy.ops.view3d.zoom`.

However, for testing it can be useful to see **every** operator called in a terminal, do this by enabling the debug option either by passing the `--debug` argument when starting blender or by setting `bpy.app.debug` to True while blender is running.

1.4.3 Use an External Editor

Blenders text editor is fine for small changes and writing tests but its not full featured, for larger projects you'll probably want to use a standalone editor or python IDE.

Editing a text file externally and having the same text open in blender does work but isn't that optimal so here are 2 ways you can easily use an external file from blender.

Using the following examples you'll still need textblock in blender to execute, but reference an external file rather than including it directly.

Executing External Scripts

This is the equivalent to running the script directly, referencing a scripts path from a 2 line textblock.

```
filename = "/full/path/to/myscript.py"
exec(compile(open(filename).read(), filename, 'exec'))
```

You might want to reference a script relative to the blend file.

```
import bpy
import os
```

```
filename = os.path.join(os.path.basename(bpy.data.filepath), "myscript.py")
exec(compile(open(filename).read(), filename, 'exec'))
```

Executing Modules

This example shows loading a script in as a module and executing a module function.

```
import myscript
import imp

imp.reload(myscript)
myscript.main()
```

Notice that the script is reloaded every time, this forces use of the modified version, otherwise the cached one in `sys.modules` would be used until blender was restarted.

The important difference between this and executing the script directly is it has to call a function in the module, in this case `main()` but it can be any function, an advantage with this is you can pass arguments to the function from this small script which is often useful for testing different settings quickly.

The other issue with this is the script has to be in python's module search path. While this is not best practice - for testing you can extend the search path, this example adds the current blend files directory to the search path, then loads the script as a module.

```
import sys
import os
import bpy

blend_dir = os.path.basename(bpy.data.filepath)
if blend_dir not in sys.path:
    sys.path.append(blend_dir)

import myscript
import imp
imp.reload(myscript)
myscript.main()
```

1.4.4 Don't Use Blender!

While developing your own scripts blenders interface can get in the way, manually reloading, running the scripts, opening file import etc. adds overhead.

For scripts that are not interactive it can end up being more efficient not to use blenders interface at all and instead execute the script on the command line.

```
blender --background --python myscript.py
```

You might want to run this with a blend file so the script has some data to operate on.

```
blender myscene.blend --background --python myscript.py
```

Note: Depending on your setup you might have to enter the full path to the blender executable.

Once the script is running properly in background mode, you'll want to check the output of the script, this depends completely on the task at hand however here are some suggestions.

- render the output to an image, use an image viewer and keep writing over the same image each time.
- save a new blend file, or export the file using one of blenders exporters.
- if the results can be displayed as text - print them or write them to a file.

This can take a little time to setup, but it can be well worth the effort to reduce the time it takes to test changes - you can even have blender running the script ever few seconds with a viewer updating the results, so no need to leave you're text editor to see changes.

1.4.5 Use External Tools

When there are no readily available python modules to perform specific tasks it's worth keeping in mind you may be able to have python execute an external command on you're data and read the result back in.

Using external programs adds an extra dependency and may limit who can use the script but to quickly setup you're own custom pipeline or writing one-off scripts this can be handy.

Examples include:

- Run The Gimp in batch mode to execute custom scripts for advanced image processing.
- Write out 3D models to use external mesh manipulation tools and read back in the results.
- Convert files into recognizable formats before reading.

1.4.6 Bundled Python & Extensions

The Blender releases distributed from blender.org include a complete python installation on all platforms, this has the disadvantage that any extensions you have installed in you're systems python wont be found by blender.

There are 2 ways around this:

- remove blender python sub-directory, blender will then fallback on the systems python and use that instead **python version must match the one that blender comes with.**
- copy the extensions into blender's python sub-directory so blender can access them, you could also copy the entire python installation into blenders sub-directory, replacing the one blender comes with. This works as long as the python versions match and the paths are created in the same relative locations. Doing this has the advantage that you can redistribute this bundle to others with blender and/or the game player, including any extensions you rely on.

1.4.7 Drop Into a Python Interpreter in You're Script

In the middle of a script you may want to inspect some variables, run some function and generally dig about to see whats going on.

```
import code
code.interact(local=locals())
```

If you want to access both global and local variables do this...

```
import code
namespace = globals().copy()
namespace.update(locals())
code.interact(local=namespace)
```

The next example is an equivalent single line version of the script above which is easier to paste into you're code:

```
__import__('code').interact(local={k: v for ns in (globals(), locals()) for k, v in ns.items()})
```

`code.interact` can be added at any line in the script and will pause the script an launch an interactive interpreter in the terminal, when you're done you can quit the interpreter and the script will continue execution.

Admittedly this highlights the lack of any python debugging support built into blender, but its still handy to know.

Note: This works in the game engine as well, it can be handy to inspect the state of a running game.

1.4.8 Advanced

Blender as a module

From a python perspective it's nicer to have everything as an extension which lets the python script combine many components.

Advantages include:

- you can use external editors/IDE's with blenders python API and execute scripts within the IDE (step over code, inspect variables as the script runs).
- editors/IDE's can auto complete blender modules & variables.
- existing scripts can import blender API's without having to run inside blender.

This is marked advanced because to run blender as a python module requires a special build option.

For instructions on building see [Building blender as a python module](#)

Python Safety (Build Option)

Since it's possible to access data which has been removed (see Gotcha's), this can be hard to track down the cause of crashes.

To raise python exceptions on accessing freed data (rather than crashing), enable the CMake build option `WITH_PYTHON_SAFETY`.

This enables data tracking which makes data access about 2x slower which is why the option is not enabled in release builds.

1.5 Gotchas

This document attempts to help you work with the Blender API in areas that can be troublesome and avoid practices that are known to give instability.

1.5.1 Using Operators

Blender's operators are tools for users to access, that python can access them too is very useful nevertheless operators have limitations that can make them cumbersome to script.

Main limits are...

- Can't pass data such as objects, meshes or materials to operate on (operators use the context instead)
- The return value from calling an operator gives the success (if it finished or was canceled), in some cases it would be more logical from an API perspective to return the result of the operation.
- Operators poll function can fail where an API function would raise an exception giving details on exactly why.

Why does an operator's poll fail?

When calling an operator gives an error like this:

```
>>> bpy.ops.action.clean(threshold=0.001)
RuntimeError: Operator bpy.ops.action.clean.poll() failed, context is incorrect
```

Which raises the question as to what the correct context might be?

Typically operators check for the active area type, a selection or active object they can operate on, but some operators are more picky about when they run.

In most cases you can figure out what context an operator needs simply by seeing how it's used in Blender and thinking about what it does.

Unfortunately if you're still stuck - the only way to **really** know what's going on is to read the source code for the poll function and see what it's checking.

For python operators it's not so hard to find the source since it's included with Blender and the source file/line is included in the operator reference docs.

Downloading and searching the C code isn't so simple, especially if you're not familiar with the C language but by searching the operator name or description you should be able to find the poll function with no knowledge of C.

Note: Blender does have the functionality for poll functions to describe why they fail, but it's currently not used much, if you're interested to help improve our API feel free to add calls to `CTX_wm_operator_poll_msg_set` where it's not obvious why poll fails.

```
>>> bpy.ops.gpencil.draw()
RuntimeError: Operator bpy.ops.gpencil.draw.poll() Failed to find Grease Pencil data to draw into
```

The operator still doesn't work!

Certain operators in Blender are only intended for use in a specific context, some operators for example are only called from the properties window where they check the current material, modifier or constraint.

Examples of this are:

- `bpy.ops.texture.slot_move`
- `bpy.ops.constraint.limitdistance_reset`
- `bpy.ops.object.modifier_copy`
- `bpy.ops.buttons.file_browse`

Another possibility is that you are the first person to attempt to use this operator in a script and some modifications need to be made to the operator to run in a different context, if the operator should logically be able to run but fails when accessed from a script it should be reported to the bug tracker.

1.5.2 Stale Data

No updates after setting values

Sometimes you want to modify values from python and immediately access the updated values, eg:

Once changing the objects `bpy.types.Object.location` you may want to access its transformation right after from `bpy.types.Object.matrix_world`, but this doesn't work as you might expect.

Consider the calculations that might go into working out the object's final transformation, this includes:

- animation function curves.
- drivers and their python expressions.
- constraints

- parent objects and all of their f-curves, constraints etc.

To avoid expensive recalculations every time a property is modified, Blender defers making the actual calculations until they are needed.

However, while the script runs you may want to access the updated values.

This can be done by calling `bpy.types.Scene.update` after modifying values which recalculates all data that is tagged to be updated.

Can I redraw during the script?

The official answer to this is no, or... *“You don’t want to do that”*.

To give some background on the topic...

While a script executes Blender waits for it to finish and is effectively locked until its done, while in this state Blender won’t redraw or respond to user input. Normally this is not such a problem because scripts distributed with Blender tend not to run for an extended period of time, nevertheless scripts *can* take ages to execute and its nice to see whats going on in the view port.

Tools that lock Blender in a loop and redraw are highly discouraged since they conflict with Blenders ability to run multiple operators at once and update different parts of the interface as the tool runs.

So the solution here is to write a **modal** operator, that is - an operator which defines a modal() function, See the modal operator template in the text editor.

Modal operators execute on user input or setup their own timers to run frequently, they can handle the events or pass through to be handled by the keymap or other modal operators.

Transform, Painting, Fly-Mode and File-Select are example of a modal operators.

Writing modal operators takes more effort than a simple `for` loop that happens to redraw but is more flexible and integrates better with Blenders design.

Ok, Ok! I still want to draw from python

If you insist - yes its possible, but scripts that use this hack wont be considered for inclusion in Blender and any issues with using it wont be considered bugs, this is also not guaranteed to work in future releases.

```
bpy.ops.wm.redraw_timer(type='DRAW_WIN_SWAP', iterations=1)
```

1.5.3 Matrix multiplication is wrong

Every so often users complain that Blenders matrix math is wrong, the confusion comes from mathutils matrices being column-major to match OpenGL and the rest of Blenders matrix operations and stored matrix data.

This is different to **numpy** which is row-major which matches what you would expect when using conventional matrix math notation.

1.5.4 I can’t edit the mesh in edit-mode!

Blender’s EditMesh is an internal data structure (not saved and not exposed to python), this gives the main annoyance that you need to exit edit-mode to edit the mesh from python.

The reason we have not made much attempt to fix this yet is because we will likely move to BMesh mesh API eventually, so any work on the API now will be wasted effort.

With the BMesh API we may expose mesh data to python so we can write useful tools in python which are also fast to execute while in edit-mode.

For the time being this limitation just has to be worked around but we're aware its frustrating needs to be addressed.

1.5.5 EditBones, PoseBones, Bone... Bones

Armature Bones in Blender have three distinct data structures that contain them. If you are accessing the bones through one of them, you may not have access to the properties you really need.

Note: In the following examples `bpy.context.object` is assumed to be an armature object.

Edit Bones

`bpy.context.object.data.edit_bones` contains a editbones; to access them you must set the armature mode to edit mode first (editbones do not exist in object or pose mode). Use these to create new bones, set their head/tail or roll, change their parenting relationships to other bones, etc.

Example using `bpy.types.EditBone` in armature editmode:

This is only possible in edit mode.

```
>>> bpy.context.object.data.edit_bones["Bone"].head = Vector((1.0, 2.0, 3.0))
```

This will be empty outside of editmode.

```
>>> mybones = bpy.context.selected_editable_bones
```

Returns an editbone only in edit mode.

```
>>> bpy.context.active_bone
```

Bones (Object Mode)

`bpy.context.object.data.bones` contains bones. These *live* in object mode, and have various properties you can change, note that the head and tail properties are read-only.

Example using `bpy.types.Bone` in object or pose mode:

Returns a bone (not an editbone) outside of edit mode

```
>>> bpy.context.active_bone
```

This works, as with blender the setting can be edited in any mode

```
>>> bpy.context.object.data.bones["Bone"].use_deform = True
```

Accessible but read-only

```
>>> tail = myobj.data.bones["Bone"].tail
```


Pose Bones

`bpy.context.object.pose.bones` contains pose bones. This is where animation data resides, i.e. animatable transformations are applied to pose bones, as are constraints and ik-settings.

Examples using `bpy.types.PoseBone` in object or pose mode:

```
# Gets the name of the first constraint (if it exists)
bpy.context.object.pose.bones["Bone"].constraints[0].name

# Gets the last selected pose bone (pose mode only)
bpy.context.active_pose_bone
```

Note: Notice the pose is accessed from the object rather than the object data, this is why blender can have 2 or more objects sharing the same armature in different poses.

Note: Strictly speaking `PoseBone`'s are not bones, they are just the state of the armature, stored in the `bpy.types.Object` rather than the `bpy.types.Armature`, the real bones are however accessible from the pose bones - `bpy.types.PoseBone.bone`

Armature Mode Switching

While writing scripts that deal with armatures you may find you have to switch between modes, when doing so take care when switching out of editmode not to keep references to the edit-bones or their head/tail vectors. Further access to these will crash blender so its important the script clearly separates sections of the code which operate in different modes.

This is mainly an issue with editmode since pose data can be manipulated without having to be in pose mode, however for operator access you may still need to enter pose mode.

1.5.6 Data Names

Naming Limitations

A common mistake is to assume newly created data is given the requested name.

This can cause bugs when you add some data (normally imported) and then reference it later by name.

```
bpy.data.meshes.new(name=meshid)

# normally some code, function calls...
bpy.data.meshes[meshid]
```

Or with name assignment...

```
obj.name = objname

# normally some code, function calls...
obj = bpy.data.meshes[objname]
```

Data names may not match the assigned values if they exceed the maximum length, are already used or an empty string.

Its better practice not to reference objects by names at all, once created you can store the data in a list, dictionary, on a class etc, there is rarely a reason to have to keep searching for the same data by name.

If you do need to use name references, its best to use a dictionary to maintain a mapping between the names of the imported assets and the newly created data, this way you don't run this risk of referencing existing data from the blend file, or worse modifying it.

```
# typically declared in the main body of the function.
mesh_name_mapping = {}

mesh = bpy.data.meshes.new(name=meshid)
mesh_name_mapping[meshid] = mesh

# normally some code, or function calls...

# use own dictionary rather than bpy.data
mesh = mesh_name_mapping[meshid]
```

Library Collisions

Blender keeps data names unique - `bpy.types.ID.name` so you can't name two objects, meshes, scenes etc the same thing by accident.

However when linking in library data from another blend file naming collisions can occur, so its best to avoid referencing data by name at all.

This can be tricky at times and not even blender handles this correctly in some case (when selecting the modifier object for eg you can't select between multiple objects with the same name), but its still good to try avoid problems in this area.

If you need to select between local and library data, there is a feature in `bpy.data` members to allow for this.

```
# typical name lookup, could be local or library.
obj = bpy.data.objects["my_obj"]

# library object name look up using a pair
# where the second argument is the library path matching bpy.types.Library.filepath
obj = bpy.data.objects["my_obj", "//my_lib.blend"]

# local object name look up using a pair
# where the second argument excludes library data from being returned.
obj = bpy.data.objects["my_obj", None]

# both the examples above also works for 'get'
obj = bpy.data.objects.get(("my_obj", None))
```

1.5.7 Relative File Paths

Blenders relative file paths are not compatible with standard python modules such as `sys` and `os`.

Built in python functions don't understand blenders `//` prefix which denotes the blend file path.

A common case where you would run into this problem is when exporting a material with associated image paths.

```
>>> bpy.path.abspath(image.filepath)
```

When using blender data from linked libraries there is an unfortunate complication since the path will be relative to the library rather than the open blend file. When the data block may be from an external blend file pass the library argument from the `bpy.types.ID`.

```
>>> bpy.path.abspath(image.filepath, library=image.library)
```

These returns the absolute path which can be used with native python modules.

1.5.8 Unicode Problems

Python supports many different encodings so there is nothing stopping you from writing a script in latin1 or iso-8859-15.

See [pep-0263](#)

However this complicates things for the python api because blend files themselves don't have an encoding.

To simplify the problem for python integration and script authors we have decided all strings in blend files **must** be UTF-8 or ASCII compatible.

This means assigning strings with different encodings to an object names for instance will raise an error.

Paths are an exception to this rule since we cannot ignore the existance of non-utf-8 paths on peoples filesystems.

This means seemingly harmless expressions can raise errors, eg.

```
>>> print(bpy.data.filepath)
UnicodeEncodeError: 'ascii' codec can't encode characters in position 10-21: ordinal not in range(128)

>>> bpy.context.object.name = bpy.data.filepath
Traceback (most recent call last):
  File "<blender_console>", line 1, in <module>
TypeError: bpy_struct: item.attr= val: Object.name expected a string type, not str
```

Here are 2 ways around filesystem encoding issues:

```
>>> print(repr(bpy.data.filepath))

>>> import os
>>> filepath_bytes = os.fsencode(bpy.data.filepath)
>>> filepath_utf8 = filepath_bytes.decode('utf-8', "replace")
>>> bpy.context.object.name = filepath_utf8
```

Unicode encoding/decoding is a big topic with comprehensive python documentation, to avoid getting stuck too deep in encoding problems - here are some suggestions:

- Always use utf-8 encoding or convert to utf-8 where the input is unknown.
- Avoid manipulating filepaths as strings directly, use `os.path` functions instead.
- Use `os.fsencode()` / `os.fsdecode()` rather than the built in string decoding functions when operating on paths.
- To print paths or to include them in the user interface use `repr(path)` first or `"%r" % path` with string formatting.
- **Possibly** - use bytes instead of python strings, when reading some input its less trouble to read it as binary data though you will still need to decide how to treat any strings you want to use with Blender, some importers do this.

1.5.9 Strange errors using ‘threading’ module

Python threading with Blender only works properly when the threads finish up before the script does. By using `threading.join()` for example.

Here's an example of threading supported by Blender:

```
import threading
import time

def prod():
    print(threading.current_thread().name, "Starting")

    # do something vaguely useful
    import bpy
    from mathutils import Vector
    from random import random

    prod_vec = Vector((random() - 0.5, random() - 0.5, random() - 0.5))
    print("Prodding", prod_vec)
    bpy.data.objects["Cube"].location += prod_vec
    time.sleep(random() + 1.0)
    # finish

    print(threading.current_thread().name, "Exiting")

threads = [threading.Thread(name="Prod %d" % i, target=prod) for i in range(10)]

print("Starting threads...")

for t in threads:
    t.start()

print("Waiting for threads to finish...")

for t in threads:
    t.join()
```

This is an example of a timer which runs many times a second and moves the default cube continuously while Blender runs (Unsupported).

```
def func():
    print("Running...")
    import bpy
    bpy.data.objects['Cube'].location.x += 0.05

def my_timer():
    from threading import Timer
    t = Timer(0.1, my_timer)
    t.start()
    func()

my_timer()
```

Use cases like the one above which leave the thread running once the script finishes may seem to work for a while but end up causing random crashes or errors in Blender's own drawing code.

So far, no work has gone into making Blender's python integration thread safe, so until it's properly supported, best not make use of this.

Note: Python's threads only allow co-currency and won't speed up your scripts on multi-processor systems, the `subprocess` and `multiprocess` modules can be used with Blender and make use of multiple CPU's too.

1.5.10 Help! My script crashes Blender

Ideally it would be impossible to crash Blender from Python however there are some problems with the API where it can be made to crash.

Strictly speaking this is a bug in the API but fixing it would mean adding memory verification on every access since most crashes are caused by the Python objects referencing Blender's memory directly, whenever the memory is freed, further Python access to it can crash the script. But fixing this would make the scripts run very slow, or writing a very different kind of API which doesn't reference the memory directly.

Here are some general hints to avoid running into these problems.

- Be aware of memory limits, especially when working with large lists since Blender can crash simply by running out of memory.
- Many hard to fix crashes end up being because of referencing freed data, when removing data be sure not to hold any references to it.
- Modules or classes that remain active while Blender is used, should not hold references to data the user may remove, instead, fetch data from the context each time the script is activated.
- Crashes may not happen every time, they may happen more on some configurations/operating-systems.

Undo/Redo

Undo invalidates all `bpy.types.ID` instances (Object, Scene, Mesh etc).

This example shows how you can tell undo changes the memory locations.

```
>>> hash(bpy.context.object)
-9223372036849950810
>>> hash(bpy.context.object)
-9223372036849950810

# ... move the active object, then undo

>>> hash(bpy.context.object)
-9223372036849951740
```

As suggested above, simply not holding references to data when Blender is used interactively by the user is the only way to ensure the script doesn't become unstable.

Edit Mode / Memory Access

Switching edit-mode `bpy.ops.object.mode_set(mode='EDIT')` / `bpy.ops.object.mode_set(mode='OBJECT')` will re-allocate objects data, any references to a meshes vertices/faces/uv's, armatures bones, curves points etc cannot be accessed after switching edit-mode.

Only the reference to the data its self can be re-accessed, the following example will crash.

```
mesh = bpy.context.active_object.data
faces = mesh.faces
bpy.ops.object.mode_set(mode='EDIT')
bpy.ops.object.mode_set(mode='OBJECT')
```

```
# this will crash
print(faces)
```

So after switching edit-mode you need to re-access any object data variables, the following example shows how to avoid the crash above.

```
mesh = bpy.context.active_object.data
faces = mesh.faces
bpy.ops.object.mode_set(mode='EDIT')
bpy.ops.object.mode_set(mode='OBJECT')
```

```
# faces have been re-allocated
faces = mesh.faces
print(faces)
```

These kinds of problems can happen for any functions which re-allocate the object data but are most common when switching edit-mode.

Array Re-Allocation

When adding new points to a curve or vertices's/edges/faces to a mesh, internally the array which stores this data is re-allocated.

```
bpy.ops.curve.primitive_bezier_curve_add()
point = bpy.context.object.data.splines[0].bezier_points[0]
bpy.context.object.data.splines[0].bezier_points.add()
```

```
# this will crash!
point.co = 1.0, 2.0, 3.0
```

This can be avoided by re-assigning the point variables after adding the new one or by storing indices's to the points rather than the points themselves.

The best way is to sidestep the problem altogether add all the points to the curve at once. This means you don't have to worry about array re-allocation and its faster too since reallocating the entire array for every point added is inefficient.

Removing Data

Any data that you remove shouldn't be modified or accessed afterwards, this includes f-curves, drivers, render layers, timeline markers, modifiers, constraints along with objects, scenes, groups, bones.. etc.

This is a problem in the API at the moment that we should eventually solve.

1.5.11 sys.exit

Some python modules will call `sys.exit()` themselves when an error occurs, while not common behavior this is something to watch out for because it may seem as if blender is crashing since `sys.exit()` will quit blender immediately.

For example, the `optparse` module will print an error and exit if the arguments are invalid.

An ugly way of troubleshooting this is to set `sys.exit = None` and see what line of python code is quitting, you could of course replace `sys.exit/` with your own function but manipulating python in this way is bad practice.

APPLICATION MODULES

2.1 Context Access (bpy.context)

The context members available depend on the area of blender which is currently being accessed.

Note that all context values are readonly, but may be modified through the data api or by running operators

2.1.1 Screen Context

`bpy.context.scene`

Type `bpy.types.Scene`

`bpy.context.visible_objects`

Type sequence of `bpy.types.Object`

`bpy.context.visible_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.selectable_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selectable_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.selected_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selected_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.selected_editable_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selected_editable_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.visible_bones`

Type sequence of `bpy.types.Object`

`bpy.context.editable_bones`

Type sequence of `bpy.types.EditBone`
`bpy.context.selected_bones`

Type sequence of `bpy.types.Bone`
`bpy.context.selected_editable_bones`

Type sequence of `bpy.types.Bone`
`bpy.context.visible_pose_bones`

Type sequence of `bpy.types.PoseBone`
`bpy.context.selected_pose_bones`

Type sequence of `bpy.types.PoseBone`
`bpy.context.active_bone`

Type `bpy.types.Bone`
`bpy.context.active_pose_bone`

Type `bpy.types.PoseBone`
`bpy.context.active_base`

Type `bpy.types.ObjectBase`
`bpy.context.active_object`

Type `bpy.types.Object`
`bpy.context.object`

Type `bpy.types.Object`
`bpy.context.edit_object`

Type `bpy.types.Object`
`bpy.context.sculpt_object`

Type `bpy.types.Object`
`bpy.context.vertex_paint_object`

Type `bpy.types.Object`
`bpy.context.weight_paint_object`

Type `bpy.types.Object`
`bpy.context.image_paint_object`

Type `bpy.types.Object`
`bpy.context.particle_edit_object`

Type `bpy.types.Object`
`bpy.context.sequences`

Type sequence of `bpy.types.Sequence`
`bpy.context.selected_sequences`

Type sequence of `bpy.types.Sequence`
`bpy.context.selected_editable_sequences`

Type sequence of `bpy.types.Sequence`

`bpy.context.active_operator`

Type `bpy.types.Operator`

2.1.2 View3D Context

`bpy.context.selected_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selected_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.selected_editable_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selected_editable_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.visible_objects`

Type sequence of `bpy.types.Object`

`bpy.context.visible_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.selectable_objects`

Type sequence of `bpy.types.Object`

`bpy.context.selectable_bases`

Type sequence of `bpy.types.ObjectBase`

`bpy.context.active_base`

Type `bpy.types.ObjectBase`

`bpy.context.active_object`

Type `bpy.types.Object`

2.1.3 Buttons Context

`bpy.context.world`

Type `bpy.types.World`

`bpy.context.object`

Type `bpy.types.Object`

`bpy.context.mesh`

Type `bpy.types.Mesh`

`bpy.context.armature`

Type `bpy.types.Armature`

`bpy.context.lattice`

Type `bpy.types.Lattice`
`bpy.context.curve`
Type `bpy.types.Curve`
`bpy.context.meta_ball`
Type `bpy.types.MetaBall`
`bpy.context.lamp`
Type `bpy.types.Lamp`
`bpy.context.speaker`
Type `bpy.types.Speaker`
`bpy.context.camera`
Type `bpy.types.Camera`
`bpy.context.material`
Type `bpy.types.Material`
`bpy.context.material_slot`
Type `bpy.types.MaterialSlot`
`bpy.context.texture`
Type `bpy.types.Texture`
`bpy.context.texture_slot`
Type `bpy.types.MaterialTextureSlot`
`bpy.context.texture_user`
Type `bpy.types.ID`
`bpy.context.bone`
Type `bpy.types.Bone`
`bpy.context.edit_bone`
Type `bpy.types.EditBone`
`bpy.context.pose_bone`
Type `bpy.types.PoseBone`
`bpy.context.particle_system`
Type `bpy.types.ParticleSystem`
`bpy.context.particle_system_editable`
Type `bpy.types.ParticleSystem`
`bpy.context.cloth`
Type `bpy.types.ClothModifier`
`bpy.context.soft_body`
Type `bpy.types.SoftBodyModifier`
`bpy.context.fluid`

Type `bpy.types.FluidSimulationModifier`

`bpy.context.smoke`

Type `bpy.types.SmokeModifier`

`bpy.context.collision`

Type `bpy.types.CollisionModifier`

`bpy.context.brush`

Type `bpy.types.Brush`

`bpy.context.dynamic_paint`

Type `bpy.types.DynamicPaintModifier`

2.1.4 Image Context

`bpy.context.edit_image`

Type `bpy.types.Image`

2.1.5 Node Context

`bpy.context.selected_nodes`

Type sequence of `bpy.types.Node`

2.1.6 Text Context

`bpy.context.edit_text`

Type `bpy.types.Text`

2.2 Data Access (`bpy.data`)

This module is used for all blender/python access.

`bpy.data`

Access to blenders internal data

Type `bpy.types.BlendData`

```
import bpy
```

```
# print all objects
for obj in bpy.data.objects:
    print(obj.name)
```

```
# print all scene names in a list
print(bpy.data.scenes.keys())
```

```
# remove mesh Cube
if "Cube" in bpy.data.meshes:
    mesh = bpy.data.meshes["Cube"]
    print("removing mesh", mesh)
    bpy.data.meshes.remove(mesh)

# write images into a file next to the blend
import os
file = open(os.path.splitext(bpy.data.filepath)[0] + ".txt", 'w')

for image in bpy.data.images:
    file.write("%s %d x %d\n" % (image.filepath, image.size[0], image.size[1]))

file.close()
```

2.3 Operators (bpy.ops)

2.3.1 Calling Operators

Provides python access to calling operators, this includes operators written in C, Python or Macros.

Only keyword arguments can be used to pass operator properties.

Operators don't have return values as you might expect, instead they return a set() which is made up of: {'RUNNING_MODAL', 'CANCELLED', 'FINISHED', 'PASS_THROUGH'}. Common return values are {'FINISHED'} and {'CANCELLED'}.

Calling an operator in the wrong context will raise a RuntimeError, there is a poll() method to avoid this problem.

Note that the operator ID (bl_idname) in this example is 'mesh.subdivide', 'bpy.ops' is just the access path for python.

```
import bpy

# calling an operator
bpy.ops.mesh.subdivide(number_cuts=3, smoothness=0.5)

# check poll() to avoid exception.
if bpy.ops.object.mode_set.poll():
    bpy.ops.object.mode_set(mode='EDIT')
```

2.3.2 Execution Context

When calling an operator you may want to pass the execution context.

This determines the context that's given to the operator to run in, and whether invoke() is called or execute().

'EXEC_DEFAULT' is used by default but you may want the operator to take user interaction with 'INVOKE_DEFAULT'.

The execution context is as a non keyword, string argument in: ('INVOKE_DEFAULT', 'INVOKE_REGION_WIN', 'INVOKE_REGION_CHANNELS', 'INVOKE_REGION_PREVIEW', 'INVOKE_AREA', 'INVOKE_SCREEN', 'EXEC_DEFAULT', 'EXEC_REGION_WIN', 'EXEC_REGION_CHANNELS', 'EXEC_REGION_PREVIEW', 'EXEC_AREA', 'EXEC_SCREEN')

```
# group add popup
import bpy
bpy.ops.object.group_instance_add(' INVOKE_DEFAULT')
```

Action Operators

`bpy.ops.action.clean` (*threshold=0.001*)

Simplify F-Curves by removing closely spaced keyframes

Parameters `threshold` (*float in [0, inf], (optional)*) – Threshold

`bpy.ops.action.clickselect` (*extend=False, column=False*)

Select keyframes by clicking on them

Parameters

- **extend** (*boolean, (optional)*) – Extend Select
- **column** (*boolean, (optional)*) – Column Select

`bpy.ops.action.copy` ()

Copy selected keyframes to the copy/paste buffer

`bpy.ops.action.delete` ()

Remove all selected keyframes

`bpy.ops.action.duplicate` ()

Make a copy of all selected keyframes

`bpy.ops.action.duplicate_move` (*ACTION_OT_duplicate=None,*
FORM_OT_transform=None)

TRANS-

Undocumented ([contribute](#))

Parameters

- **ACTION_OT_duplicate** (*ACTION_OT_duplicate, (optional)*) – Duplicate Keyframes, Make a copy of all selected keyframes
- **TRANSFORM_OT_transform** (*TRANSFORM_OT_transform, (optional)*) – Transform, Transform selected items by mode type

`bpy.ops.action.extrapolation_type` (*type='CONSTANT'*)

Set extrapolation mode for selected F-Curves

Parameters `type` (*enum in ['CONSTANT', 'LINEAR', 'MAKE_CYCLIC', 'CLEAR_CYCLIC'], (optional)*) – Type

- **CONSTANT** Constant Extrapolation.
- **LINEAR** Linear Extrapolation.
- **MAKE_CYCLIC** Make Cyclic (F-Modifier), Add Cycles F-Modifier if one doesn't exist already.
- **CLEAR_CYCLIC** Clear Cyclic (F-Modifier), Remove Cycles F-Modifier if not needed anymore.

`bpy.ops.action.frame_jump` ()

Set the current frame to the average frame of the selected keyframes

`bpy.ops.action.handle_type` (*type='FREE'*)

Set type of handle for selected keyframes

Parameters **type** (*enum in ['FREE', 'VECTOR', 'ALIGNED', 'AUTO', 'AUTO_CLAMPED'], (optional)*) – Type

- FREE Free.
- VECTOR Vector.
- ALIGNED Aligned.
- AUTO Automatic.
- AUTO_CLAMPED Auto Clamped, Auto handles clamped to not overshoot.

`bpy.ops.action.interpolation_type` (*type='CONSTANT'*)

Set interpolation mode for the F-Curve segments starting from the selected keyframes

Parameters **type** (*enum in ['CONSTANT', 'LINEAR', 'BEZIER'], (optional)*) – Type

`bpy.ops.action.keyframe_insert` (*type='ALL'*)

Insert keyframes for the specified channels

Parameters **type** (*enum in ['ALL', 'SEL', 'GROUP'], (optional)*) – Type

`bpy.ops.action.keyframe_type` (*type='KEYFRAME'*)

Set type of keyframe for the selected keyframes

Parameters **type** (*enum in ['KEYFRAME', 'BREAKDOWN', 'EXTREME', 'JITTER'], (optional)*) – Type

`bpy.ops.action.markers_make_local` ()

Move selected scene markers to the active Action as local 'pose' markers

`bpy.ops.action.mirror` (*type='CFRA'*)

Flip selected keyframes over the selected mirror line

Parameters **type** (*enum in ['CFRA', 'XAXIS', 'MARKER'], (optional)*) – Type

`bpy.ops.action.new` ()

Create new action

`bpy.ops.action.paste` (*offset='START', merge='MIX'*)

Paste keyframes from copy/paste buffer for the selected channels, starting on the current frame

Parameters

- **offset** (*enum in ['START', 'END', 'RELATIVE', 'NONE'], (optional)*) – Offset, Paste time offset of keys
 - START Frame Start, Paste keys starting at current frame.
 - END Frame End, Paste keys ending at current frame.
 - RELATIVE Frame Relative, Paste keys relative to the current frame when copying.
 - NONE No Offset, Paste keys from original time.
- **merge** (*enum in ['MIX', 'OVER_ALL', 'OVER_RANGE', 'OVER_RANGE_ALL'], (optional)*) – Type, Method of merging pasted keys and existing
 - MIX Mix, Overlay existing with new keys.
 - OVER_ALL Overwrite All, Replace all keys.
 - OVER_RANGE Overwrite Range, Overwrite keys in pasted range.
 - OVER_RANGE_ALL Overwrite Entire Range, Overwrite keys in pasted range, using the range of all copied keys.

`bpy.ops.action.previewrange_set()`
Set Preview Range based on extents of selected Keyframes

`bpy.ops.action.sample()`
Add keyframes on every frame between the selected keyframes

`bpy.ops.action.select_all_toggle(invert=False)`
Toggle selection of all keyframes

Parameters `invert` (*boolean, (optional)*) – Invert

`bpy.ops.action.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True, axis_range=False)`
Select all keyframes within the specified region

Parameters

- `gesture_mode` (*int in [-inf, inf], (optional)*) – Gesture Mode
- `xmin` (*int in [-inf, inf], (optional)*) – X Min
- `xmax` (*int in [-inf, inf], (optional)*) – X Max
- `ymin` (*int in [-inf, inf], (optional)*) – Y Min
- `ymax` (*int in [-inf, inf], (optional)*) – Y Max
- `extend` (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- `axis_range` (*boolean, (optional)*) – Axis Range

`bpy.ops.action.select_column(mode='KEYS')`
Select all keyframes on the specified frame(s)

Parameters `mode` (*enum in ['KEYS', 'CFRA', 'MARKERS_COLUMN', 'MARKERS_BETWEEN'], (optional)*) – Mode

`bpy.ops.action.select_leftright(mode='CHECK', extend=False)`
Select keyframes to the left or the right of the current frame

Parameters

- `mode` (*enum in ['CHECK', 'LEFT', 'RIGHT'], (optional)*) – Mode
- `extend` (*boolean, (optional)*) – Extend Select

`bpy.ops.action.select_less()`
Deselect keyframes on ends of selection islands

`bpy.ops.action.select_linked()`
Select keyframes occurring in the same F-Curves as selected ones

`bpy.ops.action.select_more()`
Select keyframes beside already selected ones

`bpy.ops.action.snap(type='CFRA')`
Snap selected keyframes to the times specified

Parameters `type` (*enum in ['CFRA', 'NEAREST_FRAME', 'NEAREST_SECOND', 'NEAREST_MARKER'], (optional)*) – Type

`bpy.ops.action.view_all()`
Reset viewable area to show full keyframe range

`bpy.ops.action.view_selected()`
Reset viewable area to show selected keyframes range

Anim Operators

`bpy.ops.anim.change_frame` (*frame=0*)

Interactively change the current frame number

Parameters `frame` (*int in [-300000, 300000], (optional)*) – Frame

`bpy.ops.anim.channels_click` (*extend=False, children_only=False*)

Handle mouse-clicks over animation channels

Parameters

- `extend` (*boolean, (optional)*) – Extend Select
- `children_only` (*boolean, (optional)*) – Select Children Only

`bpy.ops.anim.channels_collapse` (*all=True*)

Collapse (i.e. close) all selected expandable animation channels

Parameters `all` (*boolean, (optional)*) – All, Collapse all channels (not just selected ones)

`bpy.ops.anim.channels_delete` ()

Delete all selected animation channels

`bpy.ops.anim.channels_editable_toggle` (*mode='TOGGLE', type='PROTECT'*)

Toggle editability of selected channels

Parameters

- `mode` (*enum in ['TOGGLE', 'DISABLE', 'ENABLE', 'INVERT'], (optional)*) – Mode
- `type` (*enum in ['PROTECT', 'MUTE'], (optional)*) – Type

`bpy.ops.anim.channels_expand` (*all=True*)

Expand (i.e. open) all selected expandable animation channels

Parameters `all` (*boolean, (optional)*) – All, Expand all channels (not just selected ones)

`bpy.ops.anim.channels_fcurves_enable` ()

Clears 'disabled' tag from all F-Curves to get broken F-Curves working again

`bpy.ops.anim.channels_move` (*direction='DOWN'*)

Rearrange selected animation channels

Parameters `direction` (*enum in ['TOP', 'UP', 'DOWN', 'BOTTOM'], (optional)*) – Direction

`bpy.ops.anim.channels_rename` ()

Rename animation channel under mouse

`bpy.ops.anim.channels_select_all_toggle` (*invert=False*)

Toggle selection of all animation channels

Parameters `invert` (*boolean, (optional)*) – Invert

`bpy.ops.anim.channels_select_border` (*gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True*)

Select all animation channels within the specified region

Parameters

- `gesture_mode` (*int in [-inf, inf], (optional)*) – Gesture Mode
- `xmin` (*int in [-inf, inf], (optional)*) – X Min
- `xmax` (*int in [-inf, inf], (optional)*) – X Max
- `ymin` (*int in [-inf, inf], (optional)*) – Y Min

- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.anim.channels_setting_disable` (*mode='DISABLE', type='PROTECT'*)
Disable specified setting on all selected animation channels

Parameters

- **mode** (*enum in ['TOGGLE', 'DISABLE', 'ENABLE', 'INVERT'], (optional)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional)*) – Type

`bpy.ops.anim.channels_setting_enable` (*mode='ENABLE', type='PROTECT'*)
Enable specified setting on all selected animation channels

Parameters

- **mode** (*enum in ['TOGGLE', 'DISABLE', 'ENABLE', 'INVERT'], (optional)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional)*) – Type

`bpy.ops.anim.channels_setting_toggle` (*mode='TOGGLE', type='PROTECT'*)
Toggle specified setting on all selected animation channels

Parameters

- **mode** (*enum in ['TOGGLE', 'DISABLE', 'ENABLE', 'INVERT'], (optional)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional)*) – Type

`bpy.ops.anim.channels_visibility_set` ()
Make only the selected animation channels visible in the Graph Editor

`bpy.ops.anim.channels_visibility_toggle` ()
Toggle visibility in Graph Editor of all selected animation channels

`bpy.ops.anim.clear_useless_actions` (*only_unused=True*)
Mark actions with no F-Curves for deletion after save+reload of file preserving “action libraries”

Parameters **only_unused** (*boolean, (optional)*) – Only Unused, Only unused (Fake User only) actions get considered

File `startup/bl_operators/anim.py:244`

`bpy.ops.anim.copy_driver_button` ()
Copy the driver for the highlighted button

`bpy.ops.anim.driver_button_add` (*all=True*)
Add driver(s) for the property(s) connected represented by the highlighted button

Parameters **all** (*boolean, (optional)*) – All, Create drivers for all elements of the array

`bpy.ops.anim.driver_button_remove` (*all=True*)
Remove the driver(s) for the property(s) connected represented by the highlighted button

Parameters **all** (*boolean, (optional)*) – All, Delete drivers for all elements of the array

`bpy.ops.anim.keyframe_delete` (*type='DEFAULT', confirm_success=True*)
Delete keyframes on the current frame for all properties in the specified Keying Set

Parameters

- **type** (*enum in ['DEFAULT'], (optional)*) – Keying Set, The Keying Set to use

- **confirm_success** (*boolean, (optional)*) – Confirm Successful Insert, Show a popup when the keyframes get successfully added

`bpy.ops.anim.keyframe_delete_button` (*all=True*)

Undocumented ([contribute](#))

Parameters *all* (*boolean, (optional)*) – All, Delete keyframes from all elements of the array

`bpy.ops.anim.keyframe_delete_v3d` ()

Remove keyframes on current frame for selected object

`bpy.ops.anim.keyframe_insert` (*type='DEFAULT', confirm_success=True*)

Insert keyframes on the current frame for all properties in the specified Keying Set

Parameters

- **type** (*enum in ['DEFAULT'], (optional)*) – Keying Set, The Keying Set to use
- **confirm_success** (*boolean, (optional)*) – Confirm Successful Insert, Show a popup when the keyframes get successfully added

`bpy.ops.anim.keyframe_insert_button` (*all=True*)

Undocumented ([contribute](#))

Parameters *all* (*boolean, (optional)*) – All, Insert a keyframe for all element of the array

`bpy.ops.anim.keyframe_insert_menu` (*type='DEFAULT', confirm_success=False, always_prompt=False*)

Insert Keyframes for specified Keying Set, with menu of available Keying Sets if undefined

Parameters

- **type** (*enum in ['DEFAULT'], (optional)*) – Keying Set, The Keying Set to use
- **confirm_success** (*boolean, (optional)*) – Confirm Successful Insert, Show a popup when the keyframes get successfully added
- **always_prompt** (*boolean, (optional)*) – Always Show Menu

`bpy.ops.anim.keying_set_active_set` (*type=0*)

Undocumented ([contribute](#))

Parameters *type* (*int in [-inf, inf], (optional)*) – Keying Set Number, Index (determined internally) of the Keying Set to use

`bpy.ops.anim.keying_set_add` ()

Add a new (empty) Keying Set to the active Scene

`bpy.ops.anim.keying_set_export` (*filepath=""*, *filter_folder=True*, *filter_text=True*, *filter_python=True*)

Export Keying Set to a python script

Parameters

- **filepath** (*string, (optional)*) – File Path
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filter_text** (*boolean, (optional)*) – Filter text
- **filter_python** (*boolean, (optional)*) – Filter python

File `startup/bl_operators/anim.py:59`

`bpy.ops.anim.keying_set_path_add` ()

Add empty path to active Keying Set

`bpy.ops.anim.keying_set_path_remove()`
Remove active Path from active Keying Set

`bpy.ops.anim.keying_set_remove()`
Remove the active Keying Set

`bpy.ops.anim.keyingset_button_add(all=True)`
Undocumented ([contribute](#))

Parameters `all` (*boolean, (optional)*) – All, Add all elements of the array to a Keying Set

`bpy.ops.anim.keyingset_button_remove()`
Undocumented ([contribute](#))

`bpy.ops.anim.paste_driver_button()`
Paste the driver in the copy/paste buffer for the highlighted button

`bpy.ops.anim.previewrange_clear()`
Clear Preview Range

`bpy.ops.anim.previewrange_set(xmin=0, xmax=0, ymin=0, ymax=0)`
Interactively define frame range used for playback

Parameters

- `xmin` (*int in [-inf, inf], (optional)*) – X Min
- `xmax` (*int in [-inf, inf], (optional)*) – X Max
- `ymin` (*int in [-inf, inf], (optional)*) – Y Min
- `ymax` (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.anim.time_toggle()`
Toggle whether timing is displayed in frames or seconds for active timeline view

`bpy.ops.anim.update_data_paths()`
Update data paths from 2.56 and previous versions, modifying data paths of drivers and fcurves

File `startup/bl_operators/anim.py:271`

Armature Operators

`bpy.ops.armature.align()`
Align selected bones to the active bone (or to their parent)

`bpy.ops.armature.armature_layers(layers=(False, False))`

Change the visible armature layers

Parameters `layers` (*boolean array of 32 items, (optional)*) – Layer, Armature layers to make visible

`bpy.ops.armature.autoside_names(type='XAXIS')`
Automatically renames the selected bones according to which side of the target axis they fall on

Parameters `type` (*enum in ['XAXIS', 'YAXIS', 'ZAXIS'], (optional)*) – Axis, Axis tag names with

- XAXIS X-Axis, Left/Right.
- YAXIS Y-Axis, Front/Back.
- ZAXIS Z-Axis, Top/Bottom.

`bpy.ops.armature.bone_layers` (*layers=(False, False)*)

Change the layers that the selected bones belong to

Parameters `layers` (*boolean array of 32 items, (optional)*) – Layer, Armature layers that bone belongs to

`bpy.ops.armature.bone_primitive_add` (*name="Bone"*)

Add a new bone located at the 3D-Cursor

Parameters `name` (*string, (optional)*) – Name, Name of the newly created bone

`bpy.ops.armature.calculate_roll` (*type='X', axis_flip=False, axis_only=False*)

Automatically fix alignment of select bones' axes

Parameters

- **type** (*enum in ['X', 'Y', 'Z', 'ACTIVE', 'VIEW', 'CURSOR'], (optional)*) – Type
- **axis_flip** (*boolean, (optional)*) – Flip Axis, Negate the alignment axis
- **axis_only** (*boolean, (optional)*) – Shortest Rotation, Ignore the axis direction, use the shortest rotation to align

`bpy.ops.armature.click_extrude` ()

Create a new bone going from the last selected joint to the mouse position

`bpy.ops.armature.delete` ()

Remove selected bones from the armature

`bpy.ops.armature.duplicate` ()

Make copies of the selected bones within the same armature

`bpy.ops.armature.duplicate_move` (*ARMATURE_OT_duplicate=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **ARMATURE_OT_duplicate** (*ARMATURE_OT_duplicate, (optional)*) – Duplicate Selected Bone(s), Make copies of the selected bones within the same armature
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.armature.extrude` (*forked=False*)

Create new bones from the selected joints

Parameters `forked` (*boolean, (optional)*) – Forked

`bpy.ops.armature.extrude_forked` (*ARMATURE_OT_extrude=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **ARMATURE_OT_extrude** (*ARMATURE_OT_extrude, (optional)*) – Extrude, Create new bones from the selected joints
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.armature.extrude_move` (*ARMATURE_OT_extrude=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **ARMATURE_OT_extrude** (*ARMATURE_OT_extrude, (optional)*) – Extrude, Create new bones from the selected joints
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.armature.fill` ()
Add bone between selected joint(s) and/or 3D-Cursor

`bpy.ops.armature.flip_names` ()
Flips (and corrects) the axis suffixes of the names of selected bones

`bpy.ops.armature.hide` (*unselected=False*)
Tag selected bones to not be visible in Edit Mode

Parameters *unselected (boolean, (optional))* – Unselected, Hide unselected rather than selected

`bpy.ops.armature.layers_show_all` (*all=True*)
Make all armature layers visible

Parameters *all (boolean, (optional))* – All Layers, Enable all layers or just the first 16 (top row)

`bpy.ops.armature.merge` (*type='WITHIN_CHAIN'*)
Merge continuous chains of selected bones

Parameters *type (enum in ['WITHIN_CHAIN'], (optional))* – Type

`bpy.ops.armature.parent_clear` (*type='CLEAR'*)
Remove the parent-child relationship between selected bones and their parents

Parameters *type (enum in ['CLEAR', 'DISCONNECT'], (optional))* – ClearType, What way to clear parenting

`bpy.ops.armature.parent_set` (*type='CONNECTED'*)
Set the active bone as the parent of the selected bones

Parameters *type (enum in ['CONNECTED', 'OFFSET'], (optional))* – ParentType, Type of parenting

`bpy.ops.armature.reveal` ()
Unhide all bones that have been tagged to be hidden in Edit Mode

`bpy.ops.armature.select_all` (*action='TOGGLE'*)
Toggle selection status of all bones

Parameters *action (enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional))* – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.armature.select_hierarchy` (*direction='PARENT', extend=False*)
Select immediate parent/children of selected bones

Parameters

- **direction** (*enum in ['PARENT', 'CHILD'], (optional)*) – Direction
- **extend** (*boolean, (optional)*) – Add to Selection

`bpy.ops.armature.select_inverse()`
Flip the selection status of bones (selected -> unselected, unselected -> selected)

`bpy.ops.armature.select_linked(extend=False)`
Select bones related to selected ones by parent/child relationships

Parameters **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.armature.separate()`
Isolate selected bones into a separate armature

`bpy.ops.armature.subdivide(number_cuts=1)`
Break selected bones into chains of smaller bones

Parameters **number_cuts** (*int in [1, inf], (optional)*) – Number of Cuts

`bpy.ops.armature.switch_direction()`
Change the direction that a chain of bones points in (head <-> tail swap)

Boid Operators

`bpy.ops.boid.rule_add(type='GOAL')`
Add a boid rule to the current boid state

Parameters **type** (*enum in ['GOAL', 'AVOID', 'AVOID_COLLISION', 'SEPARATE', 'FLOCK', 'FOLLOW_LEADER', 'AVERAGE_SPEED', 'FIGHT'], (optional)*) – Type

- **GOAL** Goal, Go to assigned object or loudest assigned signal source.
- **AVOID** Avoid, Get away from assigned object or loudest assigned signal source.
- **AVOID_COLLISION** Avoid Collision, Manoeuvre to avoid collisions with other boids and deflector objects in near future.
- **SEPARATE** Separate, Keep from going through other boids.
- **FLOCK** Flock, Move to center of neighbors and match their velocity.
- **FOLLOW_LEADER** Follow Leader, Follow a boid or assigned object.
- **AVERAGE_SPEED** Average Speed, Maintain speed, flight level or wander.
- **FIGHT** Fight, Go to closest enemy and attack when in range.

`bpy.ops.boid.rule_del()`
Undocumented ([contribute](#))

`bpy.ops.boid.rule_move_down()`
Move boid rule down in the list

`bpy.ops.boid.rule_move_up()`
Move boid rule up in the list

`bpy.ops.boid.state_add()`
Add a boid state to the particle system

`bpy.ops.boid.state_del()`
Undocumented ([contribute](#))

`bpy.ops.boid.state_move_down()`
Move boid state down in the list

`bpy.ops.boid.state_move_up()`
Move boid state up in the list

Brush Operators

`bpy.ops.brush.active_index_set(mode="", index=0)`
Set active sculpt/paint brush from it's number

Parameters

- **mode** (*string, (optional)*) – mode, Paint mode to set brush for
- **index** (*int in [-inf, inf], (optional)*) – number, Brush number

File `startup/bl_operators/wm.py:161`

`bpy.ops.brush.add()`
Add brush by mode type

`bpy.ops.brush.curve_preset(shape='SMOOTH')`
Set brush shape

Parameters **shape** (*enum in ['SHARP', 'SMOOTH', 'MAX', 'LINE', 'ROUND', 'ROOT'], (optional)*) – Mode

`bpy.ops.brush.image_tool_set(tool='DRAW')`
Set the image tool

Parameters **tool** (*enum in ['DRAW', 'SOFTEN', 'SMEAR', 'CLONE'], (optional)*) – Tool

`bpy.ops.brush.reset()`
Return brush to defaults based on current tool

`bpy.ops.brush.scale_size(scalar=1.0)`
Change brush size by a scalar

Parameters **scalar** (*float in [0, 2], (optional)*) – Scalar, Factor to scale brush size by

`bpy.ops.brush.sculpt_tool_set(tool='BLOB')`
Set the sculpt tool

Parameters **tool** (*enum in ['BLOB', 'CLAY', 'CREASE', 'DRAW', 'FILL', 'FLATTEN', 'GRAB', 'INFLATE', 'LAYER', 'NUDGE', 'PINCH', 'ROTATE', 'SCRAPE', 'SMOOTH', 'SNAKE_HOOK', 'THUMB'], (optional)*) – Tool

`bpy.ops.brush.vertex_tool_set(tool='MIX')`
Set the vertex paint tool

Parameters **tool** (*enum in ['MIX', 'ADD', 'SUB', 'MUL', 'BLUR', 'LIGHTEN', 'DARKEN'], (optional)*) – Tool

- **MIX** Mix, Use mix blending mode while painting.
- **ADD** Add, Use add blending mode while painting.
- **SUB** Subtract, Use subtract blending mode while painting.
- **MUL** Multiply, Use multiply blending mode while painting.
- **BLUR** Blur, Blur the color with surrounding values.
- **LIGHTEN** Lighten, Use lighten blending mode while painting.

- **DARKEN** Darken, Use darken blending mode while painting.

`bpy.ops.brush.weight_tool_set` (*tool*='MIX')

Set the weight paint tool

Parameters *tool* (*enum in ['MIX', 'ADD', 'SUB', 'MUL', 'BLUR', 'LIGHTEN', 'DARKEN'], (optional)*) – Tool

- **MIX** Mix, Use mix blending mode while painting.
- **ADD** Add, Use add blending mode while painting.
- **SUB** Subtract, Use subtract blending mode while painting.
- **MUL** Multiply, Use multiply blending mode while painting.
- **BLUR** Blur, Blur the color with surrounding values.
- **LIGHTEN** Lighten, Use lighten blending mode while painting.
- **DARKEN** Darken, Use darken blending mode while painting.

Buttons Operators

`bpy.ops.buttons.directory_browse` (*directory*="", *filter_blender*=False, *filter_image*=False, *filter_movie*=False, *filter_python*=False, *filter_font*=False, *filter_sound*=False, *filter_text*=False, *filter_btx*=False, *filter_collada*=False, *filter_folder*=False, *filemode*=9, *relative_path*=True)

Open a directory browser, Hold Shift to open the file, Alt to browse containing directory

Parameters

- **directory** (*string, (optional)*) – Directory, Directory of the file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.buttons.file_browse` (*filepath*="", *filter_blender*=False, *filter_image*=False, *filter_movie*=False, *filter_python*=False, *filter_font*=False, *filter_sound*=False, *filter_text*=False, *filter_btx*=False, *filter_collada*=False, *filter_folder*=False, *filemode*=9, *relative_path*=True)

Open a file browser, Hold Shift to open the file, Alt to browse containing directory

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.buttons.toolbox()`
Display button panel toolbox

Camera Operators

`bpy.ops.camera.preset_add(name="", remove_active=False)`
Add a Camera Preset

Parameters **name** (*string, (optional)*) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

Clip Operators

`bpy.ops.clip.add_marker(location=(0.0, 0.0))`
Place new marker at specified location

Parameters **location** (*float array of 2 items in [-1.17549e-38, inf], (optional)*) – Location, Location of marker on frame

`bpy.ops.clip.add_marker_move(CLIP_OT_add_marker=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- **CLIP_OT_add_marker** (`CLIP_OT_add_marker`, (*optional*)) – Add Marker, Place new marker at specified location
- **TRANSFORM_OT_translate** (`TRANSFORM_OT_translate`, (*optional*)) – Translate, Translate selected items

`bpy.ops.clip.add_marker_slide(CLIP_OT_add_marker=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- **CLIP_OT_add_marker** (`CLIP_OT_add_marker`, (optional)) – Add Marker, Place new marker at specified location
- **TRANSFORM_OT_translate** (`TRANSFORM_OT_translate`, (optional)) – Translate, Translate selected items

`bpy.ops.clip.camera_preset_add` (*name=""*, *remove_active=False*)
Add a Tracking Camera Intrinsic Preset

Parameters *name* (*string*, (optional)) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

`bpy.ops.clip.change_frame` (*frame=0*)
Interactively change the current frame number

Parameters *frame* (*int in [-300000, 300000]*, (optional)) – Frame

`bpy.ops.clip.clean_tracks` (*frames=0*, *error=0.0*, *action='SELECT'*)
Clean tracks with high error values or few frames

Parameters

- **frames** (*int in [0, inf]*, (optional)) – Tracked Frames, Effect on tracks which are tracked less than specified amount of frames
- **error** (*float in [0, inf]*, (optional)) – Reprojection Error, Effect on tracks with have got larger reprojection error
- **action** (*enum in ['SELECT', 'DELETE_TRACK', 'DELETE_SEGMENTS']*, (optional)) – Action, Cleanup action to execute
 - `SELECT` Select, Select unclean tracks.
 - `DELETE_TRACK` Delete Track, Delete unclean tracks.
 - `DELETE_SEGMENTS` Delete Segments, Delete unclean segments of tracks.

`bpy.ops.clip.clear_solution` ()
Clear all calculated data

`bpy.ops.clip.clear_track_path` (*action='REMAINED'*)
Clear tracks after/before current position or clear the whole track

Parameters *action* (*enum in ['UPTO', 'REMAINED', 'ALL']*, (optional)) – Action, Clear action to execute

- `UPTO` Clear up-to, Clear path up to current frame.
- `REMAINED` Clear remained, Clear path at remaining frames (after current).
- `ALL` Clear all, Clear the whole path.

`bpy.ops.clip.constraint_to_fcurve` ()
Create F-Curves for object which will copy object's movement caused by this constraint

File `startup/bl_operators/clip.py:321`

`bpy.ops.clip.delete_marker` ()
Delete marker for current frame from selected tracks

`bpy.ops.clip.delete_proxy` ()
Delete movie clip proxy files from the hard drive

File `startup/bl_operators/clip.py:144`

`bpy.ops.clip.delete_track()`
Delete selected tracks

`bpy.ops.clip.detect_features(placement='FRAME', margin=16, min_trackness=16, min_distance=120)`
Automatically detect features and place markers to track

Parameters

- **placement** (*enum in ['FRAME', 'INSIDE_GPENCIL', 'OUTSIDE_GPENCIL'], (optional)*) – Placement, Placement for detected features
 - `FRAME` Whole Frame, Place markers across the whole frame.
 - `INSIDE_GPENCIL` Inside grease pencil, Place markers only inside areas outlined with grease pencil.
 - `OUTSIDE_GPENCIL` Outside grease pencil, Place markers only outside areas outlined with grease pencil.
- **margin** (*int in [0, inf], (optional)*) – Margin, Only corners further than margin pixels from the image edges are considered
- **min_trackness** (*int in [0, inf], (optional)*) – Trackness, Minimum score to add a corner
- **min_distance** (*int in [0, inf], (optional)*) – Distance, Minimal distance accepted between two corners

`bpy.ops.clip.disable_markers(action='DISABLE')`
Disable/enable selected markers

Parameters **action** (*enum in ['DISABLE', 'ENABLE', 'TOGGLE'], (optional)*) – Action, Disable action to execute

- `DISABLE` Disable, Disable selected markers.
- `ENABLE` Enable, Enable selected markers.
- `TOGGLE` Toggle, Toggle disabled flag for selected markers.

`bpy.ops.clip.frame_jump(position='PATHSTART')`
Jump to special frame

Parameters **position** (*enum in ['PATHSTART', 'PATHEND', 'FAILEDPREV', 'FAILNEXT'], (optional)*) – Position, Position to jump to

- `PATHSTART` Path Start, Jump to start of current path.
- `PATHEND` Path End, Jump to end of current path.
- `FAILEDPREV` Previous Failed, Jump to previous failed frame.
- `FAILNEXT` Next Failed, Jump to next failed frame.

`bpy.ops.clip.graph_delete_curve()`
Delete selected curves

`bpy.ops.clip.graph_delete_knot()`
Delete curve knots

`bpy.ops.clip.graph_select(location=(0.0, 0.0), extend=False)`
Select graph curves

Parameters

- **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Mouse location to select nearest entity

- **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection

`bpy.ops.clip.hide_tracks` (*unselected=False*)

Hide selected tracks

Parameters **unselected** (*boolean, (optional)*) – Unselected, Hide unselected tracks

`bpy.ops.clip.hide_tracks_clear` ()

Clear hide selected tracks

`bpy.ops.clip.join_tracks` ()

Join selected tracks

`bpy.ops.clip.lock_tracks` (*action='LOCK'*)

Lock/unlock selected tracks

Parameters **action** (*enum in ['LOCK', 'UNLOCK', 'TOGGLE'], (optional)*) – Action, Lock action to execute

- **LOCK** Lock, Lock selected tracks.
- **UNLOCK** Unlock, Unlock selected tracks.
- **TOGGLE** Toggle, Toggle locked flag for selected tracks.

`bpy.ops.clip.mode_set` (*mode='TRACKING', toggle=False*)

Set the clip interaction mode

Parameters

- **mode** (*enum in ['TRACKING', 'RECONSTRUCTION', 'DISTORTION'], (optional)*) – Mode
 - **TRACKING** Tracking, Show tracking and solving tools.
 - **RECONSTRUCTION** Reconstruction, Show tracking/reconstruction tools.
 - **DISTORTION** Distortion, Show distortion tools.
- **toggle** (*boolean, (optional)*) – Toggle

`bpy.ops.clip.open` (*filepath=""*, *filter_blender=False*, *filter_image=True*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *relative_path=True*)

Open clip

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files

- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.clip.properties()`
Toggle clip properties panel

`bpy.ops.clip.rebuild_proxy()`
Rebuild all selected proxies and timecode indices in the background

`bpy.ops.clip.reload()`
Reload clip

`bpy.ops.clip.select(extend=False, location=(0.0, 0.0))`
Select tracking markers

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection
- **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Mouse location in normalized coordinates, 0.0 to 1.0 is within the image bounds

`bpy.ops.clip.select_all(action='TOGGLE')`
Change selection of all tracking markers

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.clip.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True)`
Select markers using border selection

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.clip.select_circle(x=0, y=0, radius=0, gesture_mode=0)`
Select markers using circle selection

Parameters

- **x** (*int in [-inf, inf], (optional)*) – X

- **y** (*int in [-inf, inf], (optional)*) – Y
- **radius** (*int in [-inf, inf], (optional)*) – Radius
- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode

`bpy.ops.clip.select_grouped` (*group='ESTIMATED'*)
Joint Selected Tracks

Parameters **group** (*enum in ['KEYFRAMED', 'ESTIMATED', 'TRACKED', 'LOCKED', 'DISABLED', 'COLOR', 'FAILED'], (optional)*) – Action, Clear action to execute

- **KEYFRAMED** Keyframed tracks, Select all keyframed tracks.
- **ESTIMATED** Estimated tracks, Select all estimated tracks.
- **TRACKED** Tracked tracks, Select all tracked tracks.
- **LOCKED** Locked tracks, Select all locked tracks.
- **DISABLED** Disabled tracks, Select all disabled tracks.
- **COLOR** Tracks with same color, Select all tracks with same color as active track.
- **FAILED** Failed Tracks, Select all tracks which failed to be reconstructed.

`bpy.ops.clip.set_axis` (*axis='X'*)
Set direction of scene axis rotating camera (or it's parent if present) and assuming selected track lies on real axis joining it with the origin

Parameters **axis** (*enum in ['X', 'Y'], (optional)*) – Axis, Axis to use to align bundle along

- **X** X, Align bundle align X axis.
- **Y** Y, Align bundle align Y axis.

`bpy.ops.clip.set_center_principal` ()
Set optical center to center of footage

`bpy.ops.clip.set_floor` ()
Set floor based on 3 selected bundles by moving camera (or it's parent if present) in 3D space

`bpy.ops.clip.set_origin` ()
Set active marker as origin by moving camera (or it's parent if present) in 3D space

`bpy.ops.clip.set_scale` (*distance=0.0*)
Set scale of scene by scaling camera (or it's parent if present)

Parameters **distance** (*float in [-inf, inf], (optional)*) – Distance, Distance between selected tracks

`bpy.ops.clip.set_viewport_background` ()
Set current movie clip as a camera background in 3D viewport (works only when a 3D viewport is visible)

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`bpy.ops.clip.slide_marker` (*offset=(0.0, 0.0)*)
Slide marker areas

Parameters **offset** (*float array of 2 items in [-inf, inf], (optional)*) – Offset, Offset in floating point units, 1.0 is the width and height of the image

`bpy.ops.clip.solve_camera` ()
Solve camera motion from tracks

`bpy.ops.clip.stabilize_2d_add` ()
Add selected tracks to 2D stabilization tool

`bpy.ops.clip.stabilize_2d_remove()`
Remove selected track from stabilization

`bpy.ops.clip.stabilize_2d_select()`
Select track which are used for stabilization

`bpy.ops.clip.stabilize_2d_set_rotation()`
Use active track to compensate rotation when doing 2D stabilization

`bpy.ops.clip.tools()`
Toggle clip tools panel

`bpy.ops.clip.track_color_preset_add(name="", remove_active=False)`
Add a Clip Track Color Preset

Parameters `name` (*string, (optional)*) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

`bpy.ops.clip.track_copy_color()`
Copy color to all selected tracks

`bpy.ops.clip.track_markers(backwards=False, sequence=False)`
Track selected markers

Parameters

- **backwards** (*boolean, (optional)*) – Backwards, Do backwards tracking
- **sequence** (*boolean, (optional)*) – Track Sequence, Track marker during image sequence rather than single image

`bpy.ops.clip.track_to_empty()`
Create an Empty object which will be copying movement of active track

File `startup/bl_operators/clip.py:69`

`bpy.ops.clip.tracks_to_mesh()`
Create vertex cloud using coordinates of tracks

File `startup/bl_operators/clip.py:92`

`bpy.ops.clip.view_all()`
Undocumented ([contribute](#))

`bpy.ops.clip.view_pan(offset=(0.0, 0.0))`
Undocumented ([contribute](#))

Parameters `offset` (*float array of 2 items in [-inf, inf], (optional)*) – Offset, Offset in floating point units, 1.0 is the width and height of the image

`bpy.ops.clip.view_selected()`
Undocumented ([contribute](#))

`bpy.ops.clip.view_zoom(factor=0.0)`
Undocumented ([contribute](#))

Parameters `factor` (*float in [0, inf], (optional)*) – Factor, Zoom factor, values higher than 1.0 zoom in, lower values zoom out

`bpy.ops.clip.view_zoom_in()`
Undocumented ([contribute](#))

`bpy.ops.clip.view_zoom_out()`
Undocumented ([contribute](#))

`bpy.ops.clip.view_zoom_ratio` (*ratio=0.0*)
Undocumented ([contribute](#))

Parameters `ratio` (*float in [0, inf], (optional)*) – Ratio, Zoom ratio, 1.0 is 1:1, higher is zoomed in, lower is zoomed out

Cloth Operators

`bpy.ops.cloth.preset_add` (*name=""*, *remove_active=False*)
Add a Cloth Preset

Parameters `name` (*string, (optional)*) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

Console Operators

`bpy.ops.console.autocomplete` ()

Evaluate the namespace up until the cursor and give a list of options or complete the name if there is only one

File `startup/bl_operators/console.py:51`

`bpy.ops.console.banner` ()

Print a message when the terminal initializes

File `startup/bl_operators/console.py:69`

`bpy.ops.console.clear` (*scrollback=True*, *history=False*)

Clear text by type

Parameters

- **scrollback** (*boolean, (optional)*) – Scrollback, Clear the scrollback history
- **history** (*boolean, (optional)*) – History, Clear the command history

`bpy.ops.console.copy` ()

Copy selected text to clipboard

`bpy.ops.console.delete` (*type='NEXT_CHARACTER'*)

Delete text by cursor position

Parameters `type` (*enum in ['NEXT_CHARACTER', 'PREVIOUS_CHARACTER'], (optional)*) – Type, Which part of the text to delete

`bpy.ops.console.execute` ()

Execute the current console line as a python expression

File `startup/bl_operators/console.py:31`

`bpy.ops.console.history_append` (*text=""*, *current_character=0*, *remove_duplicates=False*)

Append history at cursor position

Parameters

- **text** (*string, (optional)*) – Text, Text to insert at the cursor position
- **current_character** (*int in [0, inf], (optional)*) – Cursor, The index of the cursor
- **remove_duplicates** (*boolean, (optional)*) – Remove Duplicates, Remove duplicate items in the history

`bpy.ops.console.history_cycle` (*reverse=False*)

Cycle through history

Parameters `reverse` (*boolean, (optional)*) – Reverse, Reverse cycle history

`bpy.ops.console.insert` (*text=""*)

Insert text at cursor position

Parameters `text` (*string, (optional)*) – Text, Text to insert at the cursor position

`bpy.ops.console.language` (*language=""*)

Set the current language for this console

Parameters `language` (*string, (optional)*) – Language

File `startup/bl_operators/console.py:97`

`bpy.ops.console.move` (*type='LINE_BEGIN'*)

Move cursor position

Parameters `type` (*enum in ['LINE_BEGIN', 'LINE_END', 'PREVIOUS_CHARACTER', 'NEXT_CHARACTER', 'PREVIOUS_WORD', 'NEXT_WORD'], (optional)*) – Type, Where to move cursor to

`bpy.ops.console.paste` ()

Paste text from clipboard

`bpy.ops.console.scrollback_append` (*text="", type='OUTPUT'*)

Append scrollbar text by type

Parameters

- `text` (*string, (optional)*) – Text, Text to insert at the cursor position
- `type` (*enum in ['OUTPUT', 'INPUT', 'INFO', 'ERROR'], (optional)*) – Type, Console output type

`bpy.ops.console.select_set` ()

Set the console selection

Constraint Operators

`bpy.ops.constraint.childof_clear_inverse` (*constraint="", owner='OBJECT'*)

Clear inverse correction for ChildOf constraint

Parameters

- `constraint` (*string, (optional)*) – Constraint, Name of the constraint to edit
- `owner` (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - `OBJECT` Object, Edit a constraint on the active object.
 - `BONE` Bone, Edit a constraint on the active bone.

`bpy.ops.constraint.childof_set_inverse` (*constraint="", owner='OBJECT'*)

Set inverse correction for ChildOf constraint

Parameters

- `constraint` (*string, (optional)*) – Constraint, Name of the constraint to edit
- `owner` (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - `OBJECT` Object, Edit a constraint on the active object.

- BONE Bone, Edit a constraint on the active bone.

`bpy.ops.constraint.delete()`
Remove constraint from constraint stack

`bpy.ops.constraint.limitdistance_reset` (*constraint=""*, *owner='OBJECT'*)
Reset limiting distance for Limit Distance Constraint

Parameters

- **constraint** (*string, (optional)*) – Constraint, Name of the constraint to edit
- **owner** (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - OBJECT Object, Edit a constraint on the active object.
 - BONE Bone, Edit a constraint on the active bone.

`bpy.ops.constraint.move_down` (*constraint=""*, *owner='OBJECT'*)
Move constraint down in constraint stack

Parameters

- **constraint** (*string, (optional)*) – Constraint, Name of the constraint to edit
- **owner** (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - OBJECT Object, Edit a constraint on the active object.
 - BONE Bone, Edit a constraint on the active bone.

`bpy.ops.constraint.move_up` (*constraint=""*, *owner='OBJECT'*)
Move constraint up in constraint stack

Parameters

- **constraint** (*string, (optional)*) – Constraint, Name of the constraint to edit
- **owner** (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - OBJECT Object, Edit a constraint on the active object.
 - BONE Bone, Edit a constraint on the active bone.

`bpy.ops.constraint.stretchto_reset` (*constraint=""*, *owner='OBJECT'*)
Reset original length of bone for Stretch To Constraint

Parameters

- **constraint** (*string, (optional)*) – Constraint, Name of the constraint to edit
- **owner** (*enum in ['OBJECT', 'BONE'], (optional)*) – Owner, The owner of this constraint
 - OBJECT Object, Edit a constraint on the active object.
 - BONE Bone, Edit a constraint on the active bone.

Curve Operators

`bpy.ops.curve.cyclic_toggle` (*direction='CYCLIC_U'*)
Make active spline closed/opened loop

Parameters **direction** (*enum in ['CYCLIC_U', 'CYCLIC_V'], (optional)*) – Direction, Direction to make surface cyclic in

`bpy.ops.curve.de_select_first()`
Undocumented ([contribute](#))

`bpy.ops.curve.de_select_last()`
Undocumented (contribute)

`bpy.ops.curve.delete` (*type*='SELECTED')
Delete selected control points or segments

Parameters *type* (*enum* in ['SELECTED', 'SEGMENT', 'ALL'], (*optional*)) – Type, Which elements to delete

`bpy.ops.curve.duplicate` (*mode*='TRANSLATION')
Duplicate selected control points and segments between them

Parameters *mode* (*enum* in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (*optional*)) – Mode

`bpy.ops.curve.extrude` (*mode*='TRANSLATION')
Extrude selected control point(s) and move

Parameters *mode* (*enum* in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (*optional*)) – Mode

`bpy.ops.curve.handle_type_set` (*type*='AUTOMATIC')
Set type of handles for selected control points

Parameters *type* (*enum* in ['AUTOMATIC', 'VECTOR', 'ALIGNED', 'FREE_ALIGN', 'TOGGLE_FREE_ALIGN'], (*optional*)) – Type, Spline type

`bpy.ops.curve.hide` (*unselected*=False)
Undocumented (contribute)

Parameters *unselected* (*boolean*, (*optional*)) – Unselected, Hide unselected rather than selected

`bpy.ops.curve.make_segment()`
Undocumented (contribute)

`bpy.ops.curve.primitive_bezier_circle_add` (*view_align*=False, *enter_editmode*=False, *location*=(0.0, 0.0, 0.0), *rotation*=(0.0, 0.0, 0.0), *layers*=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))

Construct a Bezier Circle

Parameters

- **view_align** (*boolean*, (*optional*)) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean*, (*optional*)) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf]*, (*optional*)) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf]*, (*optional*)) – Rotation, Rotation for the newly added object

- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.curve.primitive_bezier_curve_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Bezier Curve

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.curve.primitive_nurbs_circle_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Nurbs Circle

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.curve.primitive_nurbs_curve_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Nurbs Curve

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object

- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.curve.primitive_nurbs_path_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Path

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.curve.radius_set` (*radius=1.0*)
Set per-point radius which is used for bevel tapering

Parameters **radius** (*float in [0, inf], (optional)*) – Radius

`bpy.ops.curve.reveal` ()
Undocumented ([contribute](#))

`bpy.ops.curve.select_all` (*action='TOGGLE'*)
Undocumented ([contribute](#))

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.curve.select_inverse` ()
Undocumented ([contribute](#))

`bpy.ops.curve.select_less` ()
Undocumented ([contribute](#))

`bpy.ops.curve.select_linked` ()
Undocumented ([contribute](#))

`bpy.ops.curve.select_linked_pick` (*deselect=False*)
Undocumented ([contribute](#))

Parameters **deselect** (*boolean, (optional)*) – Deselect, Deselect linked control points rather than selecting them

`bpy.ops.curve.select_more` ()
Undocumented ([contribute](#))

`bpy.ops.curve.select_next()`
Undocumented ([contribute](#))

`bpy.ops.curve.select_nth(nth=2)`
Undocumented ([contribute](#))

Parameters `nth` (*int in [2, 100], (optional)*) – Nth Selection

`bpy.ops.curve.select_previous()`
Undocumented ([contribute](#))

`bpy.ops.curve.select_random(percent=50.0, extend=False)`
Undocumented ([contribute](#))

Parameters

- **percent** (*float in [0, 100], (optional)*) – Percent, Percentage of elements to select randomly
- **extend** (*boolean, (optional)*) – Extend Selection, Extend selection instead of deselecting everything first

`bpy.ops.curve.select_row()`
Undocumented ([contribute](#))

`bpy.ops.curve.separate()`
Undocumented ([contribute](#))

`bpy.ops.curve.shade_flat()`
Undocumented ([contribute](#))

`bpy.ops.curve.shade_smooth()`
Undocumented ([contribute](#))

`bpy.ops.curve.smooth()`
Flatten angles of selected points

`bpy.ops.curve.smooth_radius()`
Flatten radiuses of selected points

`bpy.ops.curve.spin(center=(0.0, 0.0, 0.0), axis=(0.0, 0.0, 0.0))`
Undocumented ([contribute](#))

Parameters

- **center** (*float array of 3 items in [-inf, inf], (optional)*) – Center, Center in global view space
- **axis** (*float array of 3 items in [-1, 1], (optional)*) – Axis, Axis in global view space

`bpy.ops.curve.spline_type_set(type='POLY')`
Set type of active spline

Parameters `type` (*enum in ['POLY', 'BEZIER', 'NURBS'], (optional)*) – Type, Spline type

`bpy.ops.curve.spline_weight_set(weight=1.0)`
Set softbody goal weight for selected points

Parameters `weight` (*float in [0, 1], (optional)*) – Weight

`bpy.ops.curve.subdivide(number_cuts=1)`
Subdivide selected segments

Parameters `number_cuts` (*int in [1, inf], (optional)*) – Number of cuts

`bpy.ops.curve.switch_direction()`
Switch direction of selected splines

`bpy.ops.curve.tilt_clear()`
Undocumented (contribute)

`bpy.ops.curve.vertex_add(location=(0.0, 0.0, 0.0))`
Undocumented (contribute)

Parameters `location` (float array of 3 items in $[-inf, inf]$, (optional)) – Location, Location to add new vertex at

Dpaint Operators

`bpy.ops.dpaint.bake()`
Bake dynamic paint image sequence surface

`bpy.ops.dpaint.output_toggle(output='A')`
Add or remove Dynamic Paint output data layer

Parameters `output` (enum in $['A', 'B']$, (optional)) – Output Toggle

`bpy.ops.dpaint.surface_slot_add()`
Add a new Dynamic Paint surface slot

`bpy.ops.dpaint.surface_slot_remove()`
Remove the selected surface slot

`bpy.ops.dpaint.type_toggle(type='CANVAS')`
Toggle whether given type is active or not

Parameters `type` (enum in $['CANVAS', 'BRUSH']$, (optional)) – Type

Ed Operators

`bpy.ops.ed.redo()`
Redo previous action

`bpy.ops.ed.undo()`
Undo previous action

`bpy.ops.ed.undo_history(item=0)`
Redo specific action in history

Parameters `item` (int in $[0, inf]$, (optional)) – Item

`bpy.ops.ed.undo_push(message="Add an undo step *function may be moved*")`
Add an undo state (internal use only)

Parameters `message` (string, (optional)) – Undo Message

Export Anim Operators

`bpy.ops.export_anim.bvh(filepath="", check_existing=True, filter_glob="*.bvh", global_scale=1.0, frame_start=0, frame_end=0, rotate_mode='NATIVE', root_transform_only=False)`
Save a BVH motion capture file from an armature

Parameters

- `filepath` (string, (optional)) – File Path, Filepath used for exporting the file

- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **global_scale** (*float in [0.0001, 1e+06], (optional)*) – Scale, Scale the BVH by this value
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Starting frame to export
- **frame_end** (*int in [-inf, inf], (optional)*) – End Frame, End frame to export
- **rotate_mode** (*enum in ['NATIVE', 'XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX'], (optional)*) – Rotation, Rotation conversion
 - NATIVE Euler (Native), Use the rotation order defined in the BVH file.
 - XYZ Euler (XYZ), Convert rotations to euler XYZ.
 - XZY Euler (XZY), Convert rotations to euler XZY.
 - YXZ Euler (YXZ), Convert rotations to euler YXZ.
 - YZX Euler (YZX), Convert rotations to euler YZX.
 - ZXY Euler (ZXY), Convert rotations to euler ZXY.
 - ZYX Euler (ZYX), Convert rotations to euler ZYX.
- **root_transform_only** (*boolean, (optional)*) – Root Transform Only, Only write out transform channels for the root bone

File `addons/io_anim_bvh/__init__.py:205`

Export Mesh Operators

```
bpy.ops.export_mesh.ply(filepath="", check_existing=True, filter_glob="*.ply",  
                        use_modifiers=True, use_normals=True, use_uv_coords=True,  
                        use_colors=True)
```

Export a single object as a stanford PLY with normals, colours and texture coordinates

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **use_modifiers** (*boolean, (optional)*) – Apply Modifiers, Apply Modifiers to the exported mesh
- **use_normals** (*boolean, (optional)*) – Normals, Export Normals for smooth and hard shaded faces
- **use_uv_coords** (*boolean, (optional)*) – UVs, Export the active UV layer
- **use_colors** (*boolean, (optional)*) – Vertex Colors, Exort the active vertex color layer

File `addons/io_mesh_ply/__init__.py:114`

```
bpy.ops.export_mesh.stl(filepath="", check_existing=True, ascii=False, apply_modifiers=True)
```

Save STL triangle mesh data from the active object

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files

- **ascii** (*boolean, (optional)*) – Ascii, Save the file in ASCII file format
- **apply_modifiers** (*boolean, (optional)*) – Apply Modifiers, Apply the modifiers before saving

File `addons/io_mesh_stl/__init__.py:127`

Export Scene Operators

`bpy.ops.export_scene.autodesk_3ds` (*filepath=""*, *check_existing=True*, *filter_glob="*.3ds"*, *use_selection=False*, *axis_forward='Y'*, *axis_up='Z'*)

Export to 3DS file format (.3ds)

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **use_selection** (*boolean, (optional)*) – Selection Only, Export selected objects only
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up

File `addons/io_scene_3ds/__init__.py:164`

`bpy.ops.export_scene.fbx` (*filepath=""*, *check_existing=True*, *filter_glob="*.fbx"*, *use_selection=False*, *global_scale=1.0*, *axis_forward='Z'*, *axis_up='Y'*, *object_types={'ARMATURE', 'LAMP', 'CAMERA', 'MESH', 'EMPTY'}*, *use_mesh_modifiers=True*, *mesh_smooth_type='FACE'*, *use_mesh_edges=False*, *use_anim=True*, *use_anim_action_all=True*, *use_default_take=True*, *use_anim_optimize=True*, *anim_optimize_precision=6.0*, *path_mode='AUTO'*, *use_rotate_workaround=False*, *xna_validate=False*, *batch_mode='OFF'*, *use_batch_own_dir=True*, *use_metadata=True*)

Selection to an ASCII Autodesk FBX

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **use_selection** (*boolean, (optional)*) – Selected Objects, Export selected objects on visible layers
- **global_scale** (*float in [0.01, 1000], (optional)*) – Scale, Scale all data (Some importers do not support scaled armatures!)
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up
- **object_types** (*enum set in {'EMPTY', 'CAMERA', 'LAMP', 'ARMATURE', 'MESH'}, (optional)*) – Object Types
- **use_mesh_modifiers** (*boolean, (optional)*) – Apply Modifiers, Apply modifiers to mesh objects
- **mesh_smooth_type** (*enum in ['OFF', 'FACE', 'EDGE'], (optional)*) – Smoothing

- OFF Off, Don't write smoothing.
- FACE Face, Write face smoothing.
- EDGE Edge, Write edge smoothing.
- **use_mesh_edges** (*boolean, (optional)*) – Include Edges, Edges may not be necessary, can cause import pipeline errors with XNA
- **use_anim** (*boolean, (optional)*) – Include Animation, Export keyframe animation
- **use_anim_action_all** (*boolean, (optional)*) – All Actions, Export all actions for armatures or just the currently selected action
- **use_default_take** (*boolean, (optional)*) – Include Default Take, Export currently assigned object and armature animations into a default take from the scene start/end frames
- **use_anim_optimize** (*boolean, (optional)*) – Optimize Keyframes, Remove double keyframes
- **anim_optimize_precision** (*float in [1, 16], (optional)*) – Precision, Tolerance for comparing double keyframes (higher for greater accuracy)
- **path_mode** (*enum in ['AUTO', 'ABSOLUTE', 'RELATIVE', 'MATCH', 'STRIP', 'COPY'], (optional)*) – Path Mode, Method used to reference paths
 - AUTO Auto, Use Relative paths with subdirectories only.
 - ABSOLUTE Absolute, Always write absolute paths.
 - RELATIVE Relative, Always write relative patsh (where possible).
 - MATCH Match, Match Absolute/Relative setting with input path.
 - STRIP Strip Path, Filename only.
 - COPY Copy, copy the file to the destination path (or subdirectory).
- **use_rotate_workaround** (*boolean, (optional)*) – XNA Rotate Animation Hack, Disable global rotation, for XNA compatibility
- **xna_validate** (*boolean, (optional)*) – XNA Strict Options, Make sure options are compatible with Microsoft XNA
- **batch_mode** (*enum in ['OFF', 'SCENE', 'GROUP'], (optional)*) – Batch Mode
 - OFF Off, Active scene to file.
 - SCENE Scene, Each scene as a file.
 - GROUP Group, Each group as a file.
- **use_batch_own_dir** (*boolean, (optional)*) – Batch Own Dir, Create a dir for each exported file
- **use_metadata** (*boolean, (optional)*) – Use Metadata

File `addons/io_scene_fbx/_init__.py:236`

```
bpy.ops.export_scene.obj(filepath="", check_existing=True, filter_glob="*.obj;*.mtl",
                        use_selection=False, use_animation=False, use_apply_modifiers=True,
                        use_edges=True, use_normals=False, use_uvns=True,
                        use_materials=True, use_triangles=False, use_nurbs=False,
                        use_vertex_groups=False, use_blen_objects=True,
                        group_by_object=False, group_by_material=False,
                        keep_vertex_order=False, global_scale=1.0, axis_forward='-Z',
                        axis_up='Y', path_mode='AUTO')
```

Save a Wavefront OBJ File

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **use_selection** (*boolean, (optional)*) – Selection Only, Export selected objects only
- **use_animation** (*boolean, (optional)*) – Animation, Write out an OBJ for each frame
- **use_apply_modifiers** (*boolean, (optional)*) – Apply Modifiers, Apply modifiers (preview resolution)
- **use_edges** (*boolean, (optional)*) – Include Edges
- **use_normals** (*boolean, (optional)*) – Include Normals
- **use_uv** (*boolean, (optional)*) – Include UVs, Write out the active UV coordinates
- **use_materials** (*boolean, (optional)*) – Write Materials, Write out the MTL file
- **use_triangles** (*boolean, (optional)*) – Triangulate Faces, Convert all faces to triangles
- **use_nurbs** (*boolean, (optional)*) – Write Nurbs, Write nurbs curves as OBJ nurbs rather than converting to geometry
- **use_vertex_groups** (*boolean, (optional)*) – Polygroups
- **use_blen_objects** (*boolean, (optional)*) – Objects as OBJ Objects
- **group_by_object** (*boolean, (optional)*) – Objects as OBJ Groups
- **group_by_material** (*boolean, (optional)*) – Material Groups
- **keep_vertex_order** (*boolean, (optional)*) – Keep Vertex Order
- **global_scale** (*float in [0.01, 1000], (optional)*) – Scale, Scale all data
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up
- **path_mode** (*enum in ['AUTO', 'ABSOLUTE', 'RELATIVE', 'MATCH', 'STRIP', 'COPY'], (optional)*) – Path Mode, Method used to reference paths
 - AUTO Auto, Use Relative paths with subdirectories only.
 - ABSOLUTE Absolute, Always write absolute paths.
 - RELATIVE Relative, Always write relative path (where possible).
 - MATCH Match, Match Absolute/Relative setting with input path.
 - STRIP Strip Path, Filename only.
 - COPY Copy, copy the file to the destination path (or subdirectory).

File `addons/io_scene_obj/_init__.py:328`

```
bpy.ops.export_scene.x3d(filepath="", check_existing=True, filter_glob="*.x3d",
                        use_selection=False, use_apply_modifiers=True, use_triangulate=False,
                        use_normals=False, use_compress=False, use_hierarchy=True,
                        use_h3d=False, axis_forward='Z', axis_up='Y', path_mode='AUTO')
```

Export selection to Extensible 3D file (.x3d)

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for exporting the file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **use_selection** (*boolean, (optional)*) – Selection Only, Export selected objects only
- **use_apply_modifiers** (*boolean, (optional)*) – Apply Modifiers, Use transformed mesh data from each object
- **use_triangulate** (*boolean, (optional)*) – Triangulate, Write quads into ‘IndexedTriangleSet’
- **use_normals** (*boolean, (optional)*) – Normals, Write normals with geometry
- **use_compress** (*boolean, (optional)*) – Compress, Compress the exported file
- **use_hierarchy** (*boolean, (optional)*) – Hierarchy, Export parent child relationships
- **use_h3d** (*boolean, (optional)*) – H3D Extensions, Export shaders for H3D
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up
- **path_mode** (*enum in ['AUTO', 'ABSOLUTE', 'RELATIVE', 'MATCH', 'STRIP', 'COPY'], (optional)*) – Path Mode, Method used to reference paths
 - AUTO Auto, Use Relative paths with subdirectories only.
 - ABSOLUTE Absolute, Always write absolute paths.
 - RELATIVE Relative, Always write relative patsh (where possible).
 - MATCH Match, Match Absolute/Relative setting with input path.
 - STRIP Strip Path, Filename only.
 - COPY Copy, copy the file to the destination path (or subdirectory).

File `addons/io_scene_x3d/__init__.py:169`

File Operators

`bpy.ops.file.bookmark_add()`
Add a bookmark for the selected/active directory

`bpy.ops.file.bookmark_toggle()`
Toggle bookmarks display

`bpy.ops.file.cancel()`
Cancel loading of selected file

`bpy.ops.file.delete()`
Delete selected file

`bpy.ops.file.delete_bookmark(index=-1)`
Delete selected bookmark

Parameters `index` (*int in [-1, 20000], (optional)*) – Index

`bpy.ops.file.directory()`
Enter a directory name

`bpy.ops.file.directory_new(directory=""“)`
Create a new directory

Parameters directory (*string, (optional)*) – Directory, Name of new directory

`bpy.ops.file.execute` (*need_active=False*)
Execute selected file

Parameters need_active (*boolean, (optional)*) – Need Active, Only execute if there's an active selected file in the file list

`bpy.ops.file.fileenum` (*increment=1*)
Increment number in filename

Parameters increment (*int in [-100, 100], (optional)*) – Increment

`bpy.ops.file.find_missing_files` (*filepath=""*, *filter_blender=False*, *filter_image=False*, *filter_movie=False*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=False*, *filemode=9*)

Undocumented ([contribute](#))

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

`bpy.ops.file.hidedot` ()
Toggle hide hidden dot files

`bpy.ops.file.highlight` ()
Highlight selected file(s)

`bpy.ops.file.make_paths_absolute` ()
Undocumented ([contribute](#))

`bpy.ops.file.make_paths_relative` ()
Undocumented ([contribute](#))

`bpy.ops.file.next` ()
Move to next folder

`bpy.ops.file.pack_all` ()
Undocumented ([contribute](#))

`bpy.ops.file.parent` ()
Move to parent directory

`bpy.ops.file.previous()`
Move to previous folder

`bpy.ops.file.refresh()`
Refresh the file list

`bpy.ops.file.rename()`
Rename file or file directory

`bpy.ops.file.report_missing_files()`
Undocumented ([contribute](#))

`bpy.ops.file.select(extend=False, fill=False)`
Activate/select file

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **fill** (*boolean, (optional)*) – Fill, Select everything beginning with the last selection

`bpy.ops.file.select_all_toggle()`
Select/deselect all files

`bpy.ops.file.select_bookmark(dir=""`)
Select a bookmarked directory

Parameters `dir` (*string, (optional)*) – Dir

`bpy.ops.file.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True)`
Activate/select the file(s) contained in the border

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.file.smoothscroll()`
Smooth scroll to make editable file visible

`bpy.ops.file.unpack_all(method='USE_LOCAL')`
Undocumented ([contribute](#))

Parameters `method` (*enum in ['USE_LOCAL', 'WRITE_LOCAL', 'USE_ORIGINAL', 'WRITE_ORIGINAL', 'KEEP', 'ASK'], (optional)*) – Method, How to unpack

Fluid Operators

`bpy.ops.fluid.bake()`
Bake fluid simulation

Font Operators

`bpy.ops.font.buffer_paste()`
Paste text from OS buffer

`bpy.ops.font.case_set(case='LOWER')`
Set font case

Parameters `case` (*enum in ['LOWER', 'UPPER'], (optional)*) – Case, Lower or upper case

`bpy.ops.font.case_toggle()`
Toggle font case

`bpy.ops.font.change_character(delta=1)`
Change font character code

Parameters `delta` (*int in [-255, 255], (optional)*) – Delta, Number to increase or decrease character code with

`bpy.ops.font.change_spacing(delta=1)`
Change font spacing

Parameters `delta` (*int in [-20, 20], (optional)*) – Delta, Amount to decrease or increase character spacing with

`bpy.ops.font.delete(type='ALL')`
Delete text by cursor position

Parameters `type` (*enum in ['ALL', 'NEXT_CHARACTER', 'PREVIOUS_CHARACTER', 'SELECTION', 'NEXT_OR_SELECTION', 'PREVIOUS_OR_SELECTION'], (optional)*) – Type, Which part of the text to delete

`bpy.ops.font.file_paste(filepath="", filter_blender=False, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=True, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9)`

Paste contents from file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

`bpy.ops.font.insert_lorem()`
Insert placeholder text

`bpy.ops.font.line_break(ctrl=False)`
Insert line break at cursor position

Parameters `ctrl` (*boolean, (optional)*) – Ctrl

`bpy.ops.font.move(type='LINE_BEGIN')`
Move cursor to position type

Parameters `type` (*enum in ['LINE_BEGIN', 'LINE_END', 'PREVIOUS_CHARACTER', 'NEXT_CHARACTER', 'PREVIOUS_WORD', 'NEXT_WORD', 'PREVIOUS_LINE', 'NEXT_LINE', 'PREVIOUS_PAGE', 'NEXT_PAGE'], (optional)*) – Type, Where to move cursor to

`bpy.ops.font.move_select(type='LINE_BEGIN')`
Make selection from current cursor position to new cursor position type

Parameters `type` (*enum in ['LINE_BEGIN', 'LINE_END', 'PREVIOUS_CHARACTER', 'NEXT_CHARACTER', 'PREVIOUS_WORD', 'NEXT_WORD', 'PREVIOUS_LINE', 'NEXT_LINE', 'PREVIOUS_PAGE', 'NEXT_PAGE'], (optional)*) – Type, Where to move cursor to, to make a selection

`bpy.ops.font.open(filepath="", filter_blender=False, filter_image=False, filter_movie=False, filter_python=False, filter_font=True, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, relative_path=True)`
Undocumented ([contribute](#))

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.font.style_set(style='BOLD', clear=False)`
Set font style

Parameters

- **style** (*enum in ['BOLD', 'ITALIC', 'UNDERLINE', 'SMALL_CAPS'], (optional)*) – Style, Style to set selection to

- **clear** (*boolean, (optional)*) – Clear, Clear style rather than setting it

`bpy.ops.font.style_toggle (style='BOLD')`
Toggle font style

Parameters **style** (*enum in ['BOLD', 'ITALIC', 'UNDERLINE', 'SMALL_CAPS'], (optional)*) – Style, Style to set selection to

`bpy.ops.font.text_copy ()`
Copy selected text to clipboard

`bpy.ops.font.text_cut ()`
Cut selected text to clipboard

`bpy.ops.font.text_insert (text="", accent=False)`
Insert text at cursor position

Parameters

- **text** (*string, (optional)*) – Text, Text to insert at the cursor position
- **accent** (*boolean, (optional)*) – Accent mode, Next typed character will strike through previous, for special character input

`bpy.ops.font.text_paste ()`
Paste text from clipboard

`bpy.ops.font.textbox_add ()`
Add a new text box

`bpy.ops.font.textbox_remove (index=0)`
Remove the textbox

Parameters **index** (*int in [0, inf], (optional)*) – Index, The current text box

`bpy.ops.font.unlink ()`
Unlink active font data block

Gpencil Operators

`bpy.ops.gpencil.active_frame_delete ()`
Delete the active frame for the active Grease Pencil datablock

`bpy.ops.gpencil.convert (type='PATH')`
Convert the active Grease Pencil layer to a new Object

Parameters **type** (*enum in ['PATH', 'CURVE'], (optional)*) – Type

`bpy.ops.gpencil.data_add ()`
Add new Grease Pencil datablock

`bpy.ops.gpencil.data_unlink ()`
Unlink active Grease Pencil datablock

`bpy.ops.gpencil.draw (mode='DRAW', stroke=None)`
Make annotations on the active data

Parameters

- **mode** (*enum in ['DRAW', 'DRAW_STRAIGHT', 'DRAW_POLY', 'ERASER'], (optional)*) – Mode, Way to interpret mouse movements
- **stroke** (`bpy_prop_collection of OperatorStrokeElement`, (*optional*)) – Stroke

`bpy.ops.gpencil.layer_add()`

Add new Grease Pencil layer for the active Grease Pencil datablock

Graph Operators

`bpy.ops.graph.bake()`

Bake selected F-Curves to a set of sampled points defining a similar curve

`bpy.ops.graph.clean(threshold=0.001)`

Simplify F-Curves by removing closely spaced keyframes

Parameters `threshold` (*float in [0, inf], (optional)*) – Threshold

`bpy.ops.graph.click_insert(frame=1.0, value=1.0)`

Insert new keyframe at the cursor position for the active F-Curve

Parameters

- **frame** (*float in [-inf, inf], (optional)*) – Frame Number, Frame to insert keyframe on
- **value** (*float in [-inf, inf], (optional)*) – Value, Value for keyframe on

`bpy.ops.graph.clickselect(extend=False, column=False, curves=False)`

Select keyframes by clicking on them

Parameters

- **extend** (*boolean, (optional)*) – Extend Select
- **column** (*boolean, (optional)*) – Column Select, Select all keyframes that occur on the same frame as the one under the mouse
- **curves** (*boolean, (optional)*) – Only Curves, Select all the keyframes in the curve

`bpy.ops.graph.copy()`

Copy selected keyframes to the copy/paste buffer

`bpy.ops.graph.cursor_set(frame=0, value=0.0)`

Interactively set the current frame number and value cursor

Parameters

- **frame** (*int in [-300000, 300000], (optional)*) – Frame
- **value** (*float in [1.17549e-38, inf], (optional)*) – Value

`bpy.ops.graph.delete()`

Remove all selected keyframes

`bpy.ops.graph.duplicate(mode='TRANSLATION')`

Make a copy of all selected keyframes

Parameters `mode` (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (optional)*) – Mode

`bpy.ops.graph.duplicate_move(GRAPH_OT_duplicate=None, FORM_OT_transform=None)`

TRANS-

Undocumented ([contribute](#))

Parameters

- **GRAPH_OT_duplicate** (`GRAPH_OT_duplicate`, (optional)) – Duplicate Keyframes, Make a copy of all selected keyframes
- **TRANSFORM_OT_transform** (`TRANSFORM_OT_transform`, (optional)) – Transform, Transform selected items by mode type

`bpy.ops.graph.euler_filter()`

Fixes the most common causes of gimbal lock in the selected Euler Rotation F-Curves

`bpy.ops.graph.extrapolation_type` (*type*='CONSTANT')

Set extrapolation mode for selected F-Curves

Parameters *type* (*enum in ['CONSTANT', 'LINEAR', 'MAKE_CYCLIC', 'CLEAR_CYCLIC'], (optional)*) – Type

- `CONSTANT` Constant Extrapolation.
- `LINEAR` Linear Extrapolation.
- `MAKE_CYCLIC` Make Cyclic (F-Modifier), Add Cycles F-Modifier if one doesn't exist already.
- `CLEAR_CYCLIC` Clear Cyclic (F-Modifier), Remove Cycles F-Modifier if not needed anymore.

`bpy.ops.graph.fmodifier_add` (*type*='NULL', *only_active*=True)

Add F-Modifiers to the selected F-Curves

Parameters

- *type* (*enum in ['NULL', 'GENERATOR', 'FNGENERATOR', 'ENVELOPE', 'CYCLES', 'NOISE', 'FILTER', 'LIMITS', 'STEPPED'], (optional)*) – Type
- *only_active* (*boolean, (optional)*) – Only Active, Only add F-Modifier to active F-Curve

`bpy.ops.graph.fmodifier_copy()`

Copy the F-Modifier(s) of the active F-Curve

`bpy.ops.graph.fmodifier_paste()`

Add copied F-Modifiers to the selected F-Curves

`bpy.ops.graph.frame_jump()`

Set the current frame to the average frame of the selected keyframes

`bpy.ops.graph.ghost_curves_clear()`

Clear F-Curve snapshots (Ghosts) for active Graph Editor

`bpy.ops.graph.ghost_curves_create()`

Create snapshot (Ghosts) of selected F-Curves as background aid for active Graph Editor

`bpy.ops.graph.handle_type` (*type*='FREE')

Set type of handle for selected keyframes

Parameters *type* (*enum in ['FREE', 'VECTOR', 'ALIGNED', 'AUTO', 'AUTO_CLAMPED'], (optional)*) – Type

- `FREE` Free.
- `VECTOR` Vector.
- `ALIGNED` Aligned.
- `AUTO` Automatic.
- `AUTO_CLAMPED` Auto Clamped, Auto handles clamped to not overshoot.

`bpy.ops.graph.handles_view_toggle()`

Toggle whether handles are drawn on all keyframes that need them

`bpy.ops.graph.interpolation_type` (*type*='CONSTANT')

Set interpolation mode for the F-Curve segments starting from the selected keyframes

Parameters *type* (*enum in ['CONSTANT', 'LINEAR', 'BEZIER'], (optional)*) – Type

`bpy.ops.graph.keyframe_insert` (*type*='ALL')

Insert keyframes for the specified channels

Parameters *type* (*enum in ['ALL', 'SEL'], (optional)*) – Type

`bpy.ops.graph.mirror` (*type*='CFRA')

Flip selected keyframes over the selected mirror line

Parameters *type* (*enum in ['CFRA', 'VALUE', 'YAXIS', 'XAXIS', 'MARKER'], (optional)*) – Type

`bpy.ops.graph.paste` (*offset*='START', *merge*='MIX')

Paste keyframes from copy/paste buffer for the selected channels, starting on the current frame

Parameters

- **offset** (*enum in ['START', 'END', 'RELATIVE', 'NONE'], (optional)*) – Offset, Paste time offset of keys
 - START Frame Start, Paste keys starting at current frame.
 - END Frame End, Paste keys ending at current frame.
 - RELATIVE Frame Relative, Paste keys relative to the current frame when copying.
 - NONE No Offset, Paste keys from original time.
- **merge** (*enum in ['MIX', 'OVER_ALL', 'OVER_RANGE', 'OVER_RANGE_ALL'], (optional)*) – Type, Method of merging pasted keys and existing
 - MIX Mix, Overlay existing with new keys.
 - OVER_ALL Overwrite All, Replace all keys.
 - OVER_RANGE Overwrite Range, Overwrite keys in pasted range.
 - OVER_RANGE_ALL Overwrite Entire Range, Overwrite keys in pasted range, using the range of all copied keys.

`bpy.ops.graph.previewrange_set()`

Automatically set Preview Range based on range of keyframes

`bpy.ops.graph.properties()`

Toggle display properties panel

`bpy.ops.graph.sample()`

Add keyframes on every frame between the selected keyframes

`bpy.ops.graph.select_all_toggle` (*invert*=False)

Toggle selection of all keyframes

Parameters *invert* (*boolean, (optional)*) – Invert

`bpy.ops.graph.select_border` (*gesture_mode*=0, *xmin*=0, *xmax*=0, *ymin*=0, *ymax*=0, *extend*=True, *axis_range*=False, *include_handles*=False)

Select all keyframes within the specified region

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode

- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **axis_range** (*boolean, (optional)*) – Axis Range
- **include_handles** (*boolean, (optional)*) – Include Handles, Are handles tested individually against the selection criteria

`bpy.ops.graph.select_column` (*mode='KEYS'*)
Select all keyframes on the specified frame(s)

Parameters *mode* (*enum in ['KEYS', 'CFRA', 'MARKERS_COLUMN', 'MARKERS_BETWEEN'], (optional)*) – Mode

`bpy.ops.graph.select_leftright` (*mode='CHECK', extend=False*)
Select keyframes to the left or the right of the current frame

Parameters

- **mode** (*enum in ['CHECK', 'LEFT', 'RIGHT'], (optional)*) – Mode
- **extend** (*boolean, (optional)*) – Extend Select

`bpy.ops.graph.select_less` ()
Deselect keyframes on ends of selection islands

`bpy.ops.graph.select_linked` ()
Select keyframes occurring in the same F-Curves as selected ones

`bpy.ops.graph.select_more` ()
Select keyframes beside already selected ones

`bpy.ops.graph.smooth` ()
Apply weighted moving means to make selected F-Curves less bumpy

`bpy.ops.graph.snap` (*type='CFRA'*)
Snap selected keyframes to the chosen times/values

Parameters *type* (*enum in ['CFRA', 'VALUE', 'NEAREST_FRAME', 'NEAREST_SECOND', 'NEAREST_MARKER', 'HORIZONTAL'], (optional)*) – Type

`bpy.ops.graph.sound_bake` (*filepath=""*, *filter_blender=False*, *filter_image=False*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=True*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *low=0.0*, *high=100000.0*, *attack=0.005*, *release=0.2*, *threshold=0.0*, *accumulate=False*, *use_additive=False*, *square=False*, *sthreshold=0.1*)
Bakes a sound wave to selected F-Curves

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files

- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **low** (*float in [0, 100000], (optional)*) – Lowest frequency
- **high** (*float in [0, 100000], (optional)*) – Highest frequency
- **attack** (*float in [0, 2], (optional)*) – Attack time
- **release** (*float in [0, 5], (optional)*) – Release time
- **threshold** (*float in [0, 1], (optional)*) – Threshold
- **accumulate** (*boolean, (optional)*) – Accumulate
- **use_additive** (*boolean, (optional)*) – Additive
- **square** (*boolean, (optional)*) – Square
- **sthreshold** (*float in [0, 1], (optional)*) – Square Threshold

`bpy.ops.graph.view_all ()`
Reset viewable area to show full keyframe range

`bpy.ops.graph.view_selected ()`
Reset viewable area to show selected keyframe range

Group Operators

`bpy.ops.group.create (name="Group")`
Create an object group from selected objects

Parameters `name` (*string, (optional)*) – Name, Name of the new group

`bpy.ops.group.objects_add_active ()`
Add the object to an object group that contains the active object

`bpy.ops.group.objects_remove ()`
Remove selected objects from all groups

`bpy.ops.group.objects_remove_active ()`
Remove the object from an object group that contains the active object

Image Operators

`bpy.ops.image.curves_point_set (point='BLACK_POINT')`
Undocumented ([contribute](#))

Parameters `point` (*enum in ['BLACK_POINT', 'WHITE_POINT'], (optional)*) – Point, Set black point or white point for curves

`bpy.ops.image.cycle_render_slot` (*reverse=False*)
Undocumented ([contribute](#))

Parameters `reverse` (*boolean, (optional)*) – Cycle in Reverse

`bpy.ops.image.external_edit` (*filepath=""*)
Edit image in an external application

Parameters `filepath` (*string, (optional)*) – File Path, Path to an image file

File `startup/bl_operators/image.py:62`

`bpy.ops.image.invert` (*invert_r=False, invert_g=False, invert_b=False, invert_a=False*)
Undocumented ([contribute](#))

Parameters

- `invert_r` (*boolean, (optional)*) – Red, Invert Red Channel
- `invert_g` (*boolean, (optional)*) – Green, Invert Green Channel
- `invert_b` (*boolean, (optional)*) – Blue, Invert Blue Channel
- `invert_a` (*boolean, (optional)*) – Alpha, Invert Alpha Channel

`bpy.ops.image.new` (*name="untitled", width=1024, height=1024, color=(0.0, 0.0, 0.0, 1.0), alpha=True, uv_test_grid=False, float=False*)
Create a new image

Parameters

- `name` (*string, (optional)*) – Name, Image datablock name
- `width` (*int in [1, inf], (optional)*) – Width, Image width
- `height` (*int in [1, inf], (optional)*) – Height, Image height
- `color` (*float array of 4 items in [0, inf], (optional)*) – Color, Default fill color
- `alpha` (*boolean, (optional)*) – Alpha, Create an image with an alpha channel
- `uv_test_grid` (*boolean, (optional)*) – UV Test Grid, Fill the image with a grid for UV map testing
- `float` (*boolean, (optional)*) – 32 bit Float, Create image with 32 bit floating point bit depth

`bpy.ops.image.open` (*filepath="", filter_blender=False, filter_image=True, filter_movie=True, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, relative_path=True*)

Open image

Parameters

- `filepath` (*string, (optional)*) – File Path, Path to file
- `filter_blender` (*boolean, (optional)*) – Filter .blend files
- `filter_image` (*boolean, (optional)*) – Filter image files
- `filter_movie` (*boolean, (optional)*) – Filter movie files
- `filter_python` (*boolean, (optional)*) – Filter python files
- `filter_font` (*boolean, (optional)*) – Filter font files
- `filter_sound` (*boolean, (optional)*) – Filter sound files
- `filter_text` (*boolean, (optional)*) – Filter text files

- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.image.pack` (*as_png=False*)
Pack an image as embedded data into the .blend file

Parameters `as_png` (*boolean, (optional)*) – Pack As PNG, Pack image as lossless PNG

`bpy.ops.image.project_apply` ()
Project edited image back onto the object

File `startup/bl_operators/image.py:211`

`bpy.ops.image.project_edit` ()
Edit a snapshot of the viewport in an external image editor

File `startup/bl_operators/image.py:140`

`bpy.ops.image.properties` ()
Toggle display properties panel

`bpy.ops.image.record_composite` ()
Undocumented ([contribute](#))

`bpy.ops.image.reload` ()
Undocumented ([contribute](#))

`bpy.ops.image.replace` (*filepath=""*, *filter_blender=False*, *filter_image=True*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *relative_path=True*)
Undocumented ([contribute](#))

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.image.sample()`
Undocumented ([contribute](#))

`bpy.ops.image.sample_line(xstart=0, xend=0, ystart=0, yend=0, cursor=1002)`
Undocumented ([contribute](#))

Parameters

- **xstart** (*int in [-inf, inf], (optional)*) – X Start
- **xend** (*int in [-inf, inf], (optional)*) – X End
- **ystart** (*int in [-inf, inf], (optional)*) – Y Start
- **yend** (*int in [-inf, inf], (optional)*) – Y End
- **cursor** (*int in [0, inf], (optional)*) – Cursor, Mouse cursor style to use during the modal operator

`bpy.ops.image.save()`
Undocumented ([contribute](#))

`bpy.ops.image.save_as(file_format='PNG', color_mode='RGB', file_quality=90, filepath="", check_existing=True, filter_blender=False, filter_image=True, filter_movie=True, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, relative_path=True, copy=False)`

Undocumented ([contribute](#))

Parameters

- **file_format** (*enum in ['TARGA', 'TARGA RAW', 'PNG', 'BMP', 'JPEG', 'IRIS'], (optional)*) – File Type, File type to save image as
- **color_mode** (*enum in ['BW', 'RGB', 'RGBA'], (optional)*) – Channels, Image channels to save
 - BW BW, Images get saved in 8 bits grayscale (only PNG, JPEG, TGA, TIF).
 - RGB RGB, Images are saved with RGB (color) data.
 - RGBA RGBA, Images are saved with RGB and Alpha data (if supported).
- **file_quality** (*int in [0, 100], (optional)*) – Quality
- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files

- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **copy** (*boolean, (optional)*) – Copy, Create a new image file without modifying the current image in blender

`bpy.ops.image.save_dirty()`
Save all modified textures

File `startup/bl_operators/image.py:115`

`bpy.ops.image.save_sequence()`
Undocumented ([contribute](#))

`bpy.ops.image.scopes()`
Toggle display scopes panel

`bpy.ops.image.unpack(method='USE_LOCAL', id="")`
Save an image packed in the .blend file to disk

Parameters

- **method** (*enum in ['USE_LOCAL', 'WRITE_LOCAL', 'USE_ORIGINAL', 'WRITE_ORIGINAL'], (optional)*) – Method, How to unpack
- **id** (*string, (optional)*) – Image Name, Image datablock name to unpack

`bpy.ops.image.view_all()`
Undocumented ([contribute](#))

`bpy.ops.image.view_ndof()`
Undocumented ([contribute](#))

`bpy.ops.image.view_pan(offset=(0.0, 0.0))`
Undocumented ([contribute](#))

Parameters **offset** (*float array of 2 items in [-inf, inf], (optional)*) – Offset, Offset in floating point units, 1.0 is the width and height of the image

`bpy.ops.image.view_selected()`
Undocumented ([contribute](#))

`bpy.ops.image.view_zoom(factor=0.0)`
Undocumented ([contribute](#))

Parameters **factor** (*float in [0, inf], (optional)*) – Factor, Zoom factor, values higher than 1.0 zoom in, lower values zoom out

`bpy.ops.image.view_zoom_in()`
Undocumented ([contribute](#))

`bpy.ops.image.view_zoom_out()`
Undocumented ([contribute](#))

`bpy.ops.image.view_zoom_ratio(ratio=0.0)`
Undocumented ([contribute](#))

Parameters **ratio** (*float in [0, inf], (optional)*) – Ratio, Zoom ratio, 1.0 is 1:1, higher is zoomed in, lower is zoomed out

Import Anim Operators

```
bpy.ops.import_anim.bvh (filepath="", filter_glob="*.bvh", target='ARMATURE',
                        global_scale=1.0, frame_start=1, use_cyclic=False, rotate_mode='NATIVE', axis_forward='-Z', axis_up='Y')
```

Load a BVH motion capture file

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **target** (*enum in ['ARMATURE', 'OBJECT'], (optional)*) – Target, Import target type
- **global_scale** (*float in [0.0001, 1e+06], (optional)*) – Scale, Scale the BVH by this value
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Starting frame for the animation
- **use_cyclic** (*boolean, (optional)*) – Loop, Loop the animation playback
- **rotate_mode** (*enum in ['QUATERNION', 'NATIVE', 'XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX'], (optional)*) – Rotation, Rotation conversion
 - QUATERNION Quaternion, Convert rotations to quaternions.
 - NATIVE Euler (Native), Use the rotation order defined in the BVH file.
 - XYZ Euler (XYZ), Convert rotations to euler XYZ.
 - XZY Euler (XZY), Convert rotations to euler XZY.
 - YXZ Euler (YXZ), Convert rotations to euler YXZ.
 - YZX Euler (YZX), Convert rotations to euler YZX.
 - ZXY Euler (ZXY), Convert rotations to euler ZXY.
 - ZYX Euler (ZYX), Convert rotations to euler ZYX.
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up

File `addons/io_anim_bvh/__init__.py:130`

Import Curve Operators

```
bpy.ops.import_curve.svg (filepath="", filter_glob="*.svg")
```

Load a SVG file

Parameters **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file

File `addons/io_curve_svg/__init__.py:58`

Import Mesh Operators

```
bpy.ops.import_mesh.ply (filepath="", files=None, directory="", filter_glob="*.ply")
```

Load a PLY geometry file

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – File Path, File path used for importing the PLY file

File `addons/io_mesh_ply/__init__.py:67`

`bpy.ops.import_mesh.stl` (`filepath=""`, `filter_glob="*.stl"`, `files=None`, `directory=""`)
Load STL triangle mesh data

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **files** (`bpy_prop_collection` of `OperatorFileListElement`, (*optional*)) – File Path

File `addons/io_mesh_stl/__init__.py:86`

Import Scene Operators

`bpy.ops.import_scene.autodesk_3ds` (`filepath=""`, `filter_glob="*.3ds"`, `constrain_size=10.0`,
`use_image_search=True`, `use_apply_transform=True`,
`axis_forward='Y'`, `axis_up='Z'`)

Import from 3DS file format (.3ds)

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **constrain_size** (*float in [0, 1000], (optional)*) – Size Constraint, Scale the model by 10 until it reaches the size constraint. Zero Disables
- **use_image_search** (*boolean, (optional)*) – Image Search, Search subdirectories for any associated images (Warning, may be slow)
- **use_apply_transform** (*boolean, (optional)*) – Apply Transform, Workaround for object transformations importing incorrectly
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up

File `addons/io_scene_3ds/__init__.py:107`

`bpy.ops.import_scene.obj` (`filepath=""`, `filter_glob="*.obj;*.mtl"`, `use_ngons=True`,
`use_edges=True`, `use_smooth_groups=True`, `use_split_objects=True`,
`use_split_groups=True`, `use_groups_as_vgroups=False`,
`use_image_search=True`, `split_mode='ON'`, `global_clamp_size=0.0`,
`axis_forward='-Z'`, `axis_up='Y'`)

Load a Wavefront OBJ File

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **use_ngons** (*boolean, (optional)*) – NGons, Import faces with more than 4 verts as fgons
- **use_edges** (*boolean, (optional)*) – Lines, Import lines and faces with 2 verts as edge
- **use_smooth_groups** (*boolean, (optional)*) – Smooth Groups, Surround smooth groups by sharp edges
- **use_split_objects** (*boolean, (optional)*) – Object, Import OBJ Objects into Blender Objects
- **use_split_groups** (*boolean, (optional)*) – Group, Import OBJ Groups into Blender Objects
- **use_groups_as_vgroups** (*boolean, (optional)*) – Poly Groups, Import OBJ groups as vertex groups

- **use_image_search** (*boolean, (optional)*) – Image Search, Search subdirs for any associated images (Warning, may be slow)
- **split_mode** (*enum in ['ON', 'OFF'], (optional)*) – Split
 - ON Split, Split geometry, omits unused verts.
 - OFF Keep Vert Order, Keep vertex order from file.
- **global_clamp_size** (*float in [0, 1000], (optional)*) – Clamp Scale, Clamp the size to this maximum (Zero to Disable)
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up

File `addons/io_scene_obj/__init__.py:147`

```
bpy.ops.import_scene.x3d(filepath="", filter_glob="*.x3d;*.wrl", axis_forward='Z',
                        axis_up='Y')
```

Import and X3D or VRML file

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **axis_forward** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Forward
- **axis_up** (*enum in ['X', 'Y', 'Z', '-X', '-Y', '-Z'], (optional)*) – Up

File `addons/io_scene_x3d/__init__.py:84`

Info Operators

```
bpy.ops.info.report_copy()
```

Copy selected reports to Clipboard

```
bpy.ops.info.report_delete()
```

Delete selected reports

```
bpy.ops.info.report_replay()
```

Replay selected reports

```
bpy.ops.info.reports_display_update()
```

Undocumented ([contribute](#))

```
bpy.ops.info.select_all_toggle()
```

(de)select all reports

```
bpy.ops.info.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True)
```

Toggle border selection

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.info.select_pick` (*report_index=0*)
Select reports by index

Parameters `report_index` (*int in [0, inf], (optional)*) – Report, Index of the report

Lamp Operators

`bpy.ops.lamp.sunsky_preset_add` (*name=""*, *remove_active=False*)
Add a Sky & Atmosphere Preset

Parameters `name` (*string, (optional)*) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

Lattice Operators

`bpy.ops.lattice.make_regular` ()
Set UVW control points a uniform distance apart

`bpy.ops.lattice.select_all` (*action='TOGGLE'*)
Change selection of all UVW control points

Parameters `action` (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- `TOGGLE` Toggle, Toggle selection for all elements.
- `SELECT` Select, Select all elements.
- `DESELECT` Deselect, Deselect all elements.
- `INVERT` Invert, Invert selection of all elements.

Logic Operators

`bpy.ops.logic.actuator_add` (*type='', name=""*, *object=""*)
Add an actuator to the active object

Parameters

- `type` (*enum in [], (optional)*) – Type, Type of actuator to add
- `name` (*string, (optional)*) – Name, Name of the Actuator to add
- `object` (*string, (optional)*) – Object, Name of the Object to add the Actuator to

`bpy.ops.logic.actuator_move` (*actuator=""*, *object=""*, *direction='UP'*)
Move Actuator

Parameters

- `actuator` (*string, (optional)*) – Actuator, Name of the actuator to edit
- `object` (*string, (optional)*) – Object, Name of the object the actuator belongs to
- `direction` (*enum in ['UP', 'DOWN'], (optional)*) – Direction, Move Up or Down

`bpy.ops.logic.actuator_remove` (*actuator=""*, *object=""*)
Remove an actuator from the active object

Parameters

- **actuator** (*string, (optional)*) – Actuator, Name of the actuator to edit
- **object** (*string, (optional)*) – Object, Name of the object the actuator belongs to

`bpy.ops.logic.controller_add` (*type='LOGIC_AND', name=""*, *object=""*)
Add a controller to the active object

Parameters

- **type** (*enum in ['LOGIC_AND', 'LOGIC_OR', 'LOGIC_NAND', 'LOGIC_NOR', 'LOGIC_XOR', 'LOGIC_XNOR', 'EXPRESSION', 'PYTHON'], (optional)*) – Type, Type of controller to add
 - LOGIC_AND And, Logic And.
 - LOGIC_OR Or, Logic Or.
 - LOGIC_NAND Nand, Logic Nand.
 - LOGIC_NOR Nor, Logic Nor.
 - LOGIC_XOR Xor, Logic Xor.
 - LOGIC_XNOR Xnor, Logic Xnor.
 - EXPRESSION Expression.
 - PYTHON Python.
- **name** (*string, (optional)*) – Name, Name of the Controller to add
- **object** (*string, (optional)*) – Object, Name of the Object to add the Controller to

`bpy.ops.logic.controller_move` (*controller=""*, *object=""*, *direction='UP'*)
Move Controller

Parameters

- **controller** (*string, (optional)*) – Controller, Name of the controller to edit
- **object** (*string, (optional)*) – Object, Name of the object the controller belongs to
- **direction** (*enum in ['UP', 'DOWN'], (optional)*) – Direction, Move Up or Down

`bpy.ops.logic.controller_remove` (*controller=""*, *object=""*)
Remove a controller from the active object

Parameters

- **controller** (*string, (optional)*) – Controller, Name of the controller to edit
- **object** (*string, (optional)*) – Object, Name of the object the controller belongs to

`bpy.ops.logic.links_cut` (*path=None*, *cursor=9*)
Remove logic brick connections

Parameters

- **path** (*bpy_prop_collection of OperatorMousePath, (optional)*) – path
- **cursor** (*int in [0, inf], (optional)*) – Cursor

`bpy.ops.logic.properties` ()
Toggle display properties panel

`bpy.ops.logic.sensor_add` (*type='', name=""*, *object=""*)
Add a sensor to the active object

Parameters

- **type** (*enum in [], (optional)*) – Type, Type of sensor to add
- **name** (*string, (optional)*) – Name, Name of the Sensor to add
- **object** (*string, (optional)*) – Object, Name of the Object to add the Sensor to

`bpy.ops.logic.sensor_move (sensor="" , object="" , direction='UP')`
Move Sensor

Parameters

- **sensor** (*string, (optional)*) – Sensor, Name of the sensor to edit
- **object** (*string, (optional)*) – Object, Name of the object the sensor belongs to
- **direction** (*enum in ['UP', 'DOWN'], (optional)*) – Direction, Move Up or Down

`bpy.ops.logic.sensor_remove (sensor="" , object="")`
Remove a sensor from the active object

Parameters

- **sensor** (*string, (optional)*) – Sensor, Name of the sensor to edit
- **object** (*string, (optional)*) – Object, Name of the object the sensor belongs to

`bpy.ops.logic.textface_convert ()`
Convert old textface settings into material. It may create new materials if needed

Marker Operators

`bpy.ops.marker.add ()`
Add a new time marker

`bpy.ops.marker.camera_bind ()`
Bind the active camera to selected markers(s)

`bpy.ops.marker.delete ()`
Delete selected time marker(s)

`bpy.ops.marker.duplicate (frames=0)`
Duplicate selected time marker(s)

Parameters **frames** (*int in [-inf, inf], (optional)*) – Frames

`bpy.ops.marker.make_links_scene (scene='')`
Copy selected markers to another scene

Parameters **scene** (*enum in [], (optional)*) – Scene

`bpy.ops.marker.move (frames=0)`
Move selected time marker(s)

Parameters **frames** (*int in [-inf, inf], (optional)*) – Frames

`bpy.ops.marker.rename (name="RenamedMarker")`
Rename first selected time marker

Parameters **name** (*string, (optional)*) – Name, New name for marker

`bpy.ops.marker.select (extend=False, camera=False)`
Select time marker(s)

Parameters

- **extend** (*boolean, (optional)*) – Extend, extend the selection

- **camera** (*boolean, (optional)*) – Camera, Select the camera

`bpy.ops.marker.select_all` (*action='TOGGLE'*)

Change selection of all time markers

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- **TOGGLE** Toggle, Toggle selection for all elements.
- **SELECT** Select, Select all elements.
- **DESELECT** Deselect, Deselect all elements.
- **INVERT** Invert, Invert selection of all elements.

`bpy.ops.marker.select_border` (*gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True*)

Select all time markers using border selection

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

Material Operators

`bpy.ops.material.copy` ()

Copy the material settings and nodes

`bpy.ops.material.new` ()

Add a new material

`bpy.ops.material.paste` ()

Paste the material settings and nodes

`bpy.ops.material.sss_preset_add` (*name="" , remove_active=False*)

Add a Subsurface Scattering Preset

Parameters **name** (*string, (optional)*) – Name, Name of the preset, used to make the path name

File `startup/bl_operators/presets.py:50`

Mball Operators

`bpy.ops.mball.delete_metaelems` ()

Delete selected metaelement(s)

`bpy.ops.mball.duplicate_metaelems` (*mode='TRANSLATION'*)

Delete selected metaelement(s)

Parameters mode (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (optional)*) – Mode

`bpy.ops.mball.hide_metaelems` (*unselected=False*)
Hide (un)selected metaelement(s)

Parameters unselected (*boolean, (optional)*) – Unselected, Hide unselected rather than selected

`bpy.ops.mball.reveal_metaelems` ()
Reveal all hidden metaelements

`bpy.ops.mball.select_all` (*action='TOGGLE'*)
Change selection of all meta elements

Parameters action (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.mball.select_inverse_metaelems` ()
Select inverse of (un)selected metaelements

`bpy.ops.mball.select_random_metaelems` (*percent=0.5*)
Randomly select metaelements

Parameters percent (*float in [0, 1], (optional)*) – Percent, Percentage of metaelems to select randomly

Mesh Operators

`bpy.ops.mesh.beautify_fill` ()
Rearrange geometry on a selected surface to avoid skinny faces

`bpy.ops.mesh.blend_from_shape` (*shape='', blend=1.0, add=False*)
Blend in shape from a shape key

Parameters

- **shape** (*enum in [], (optional)*) – Shape, Shape key to use for blending
- **blend** (*float in [-inf, inf], (optional)*) – Blend, Blending factor
- **add** (*boolean, (optional)*) – Add, Add rather than blend between shapes

`bpy.ops.mesh.colors_mirror` (*axis='X'*)
Mirror UV/image color layer

Parameters axis (*enum in ['X', 'Y'], (optional)*) – Axis, Axis to mirror colors around

`bpy.ops.mesh.colors_rotate` (*direction='CW'*)
Rotate UV/image color layer

Parameters direction (*enum in ['CW', 'CCW'], (optional)*) – Direction, Direction to rotate edge around

`bpy.ops.mesh.delete` (*type*='VERT')
Delete selected vertices, edges or faces

Parameters *type* (*enum* in ['VERT', 'EDGE', 'FACE', 'ALL', 'EDGE_FACE', 'ONLY_FACE', 'EDGE_LOOP'], (*optional*)) – Type, Method used for deleting mesh data

`bpy.ops.mesh.delete_edgeloop` ()
Delete an edge loop by merging the faces on each side to a single face loop

File `startup/bl_operators/wm.py:38`

`bpy.ops.mesh.drop_named_image` (*name*="Image", *filepath*="Path")
Assigns Image to active UV layer, or creates a UV layer

Parameters

- **name** (*string*, (*optional*)) – Name, Image name to assign
- **filepath** (*string*, (*optional*)) – Filepath, Path to image file

`bpy.ops.mesh.dupli_extrude_cursor` (*rotate_source*=True)
Duplicate and extrude selected vertices, edges or faces towards 3D Cursor

Parameters *rotate_source* (*boolean*, (*optional*)) – Rotate Source, Rotate initial selection giving better shape

`bpy.ops.mesh.duplicate` (*mode*='TRANSLATION')
Duplicate selected vertices, edges or faces

Parameters *mode* (*enum* in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (*optional*)) – Mode

`bpy.ops.mesh.duplicate_move` (*MESH_OT_duplicate*=None, *TRANSFORM_OT_translate*=None)
Undocumented ([contribute](#))

Parameters

- **MESH_OT_duplicate** (*MESH_OT_duplicate*, (*optional*)) – Duplicate Mesh, Duplicate selected vertices, edges or faces
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate*, (*optional*)) – Translate, Translate selected items

`bpy.ops.mesh.edge_face_add` ()
Add an edge or face to selected

`bpy.ops.mesh.edge_flip` ()
Flip selected edge or adjoining faces

`bpy.ops.mesh.edge_rotate` (*direction*='CW')
Rotate selected edge or adjoining faces

Parameters *direction* (*enum* in ['CW', 'CCW'], (*optional*)) – Direction, Direction to rotate the edge around

`bpy.ops.mesh.edgering_select` (*extend*=False)
Select an edge ring

Parameters *extend* (*boolean*, (*optional*)) – Extend, Extend the selection

`bpy.ops.mesh.edges_select_sharp` (*sharpness=0.01*)

Marked selected edges as sharp

Parameters `sharpness` (*float in [0, inf], (optional)*) – sharpness

`bpy.ops.mesh.extrude` (*type='REGION'*)

Extrude selected vertices, edges or faces

Parameters `type` (*enum in ['REGION', 'FACES', 'EDGES', 'VERTS'], (optional)*) – Type

`bpy.ops.mesh.extrude_edges_move` (*MESH_OT_extrude=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **MESH_OT_extrude** (*MESH_OT_extrude, (optional)*) – Extrude, Extrude selected vertices, edges or faces
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.mesh.extrude_faces_move` (*MESH_OT_extrude=None, TRANSFORM_OT_shrink_fatten=None*)

Undocumented ([contribute](#))

Parameters

- **MESH_OT_extrude** (*MESH_OT_extrude, (optional)*) – Extrude, Extrude selected vertices, edges or faces
- **TRANSFORM_OT_shrink_fatten** (*TRANSFORM_OT_shrink_fatten, (optional)*) – Shrink/Fatten, Shrink/fatten selected vertices along normals

`bpy.ops.mesh.extrude_region_move` (*MESH_OT_extrude=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **MESH_OT_extrude** (*MESH_OT_extrude, (optional)*) – Extrude, Extrude selected vertices, edges or faces
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.mesh.extrude_repeat` (*offset=2.0, steps=10, direction=(0.0, 0.0, 0.0)*)

Extrude selected vertices, edges or faces repeatedly

Parameters

- **offset** (*float in [0, 100], (optional)*) – Offset
- **steps** (*int in [0, 180], (optional)*) – Steps
- **direction** (*float array of 3 items in [-inf, inf], (optional)*) – Direction, Direction of extrude

`bpy.ops.mesh.extrude_vertices_move` (*MESH_OT_extrude=None, TRANSFORM_OT_translate=None*)

Undocumented ([contribute](#))

Parameters

- **MESH_OT_extrude** (*MESH_OT_extrude, (optional)*) – Extrude, Extrude selected vertices, edges or faces

- **TRANSFORM_OT_translate** (`TRANSFORM_OT_translate`, (optional)) – Translate, Translate selected items

`bpy.ops.mesh.faces_mirror_uv` (*direction='POSITIVE'*)
Copy mirror UV coordinates on the X axis based on a mirrored mesh

Parameters `direction` (*enum in ['POSITIVE', 'NEGATIVE'], (optional)*) – Axis Direction

File `startup/bl_operators/mesh.py:88`

`bpy.ops.mesh.faces_select_interior` ()
Select faces where all edges have more then 2 face users

File `startup/bl_operators/mesh.py:39`

`bpy.ops.mesh.faces_select_linked_flat` (*sharpness=135.0*)
Select linked faces by angle

Parameters `sharpness` (*float in [0, inf], (optional)*) – sharpness

`bpy.ops.mesh.faces_shade_flat` ()
Display faces 'flat'

`bpy.ops.mesh.faces_shade_smooth` ()
Display faces 'smooth' (using vertex normals)

`bpy.ops.mesh.fgon_clear` ()
Clear fgon from selected face

`bpy.ops.mesh.fgon_make` ()
Make fgon from selected faces

`bpy.ops.mesh.fill` ()
Create a segment, edge or face

`bpy.ops.mesh.flip_normals` ()
Toggle the direction of selected face's vertex and face normals

`bpy.ops.mesh.hide` (*unselected=False*)
Hide (un)selected vertices, edges or faces

Parameters `unselected` (*boolean, (optional)*) – Unselected, Hide unselected rather than selected

`bpy.ops.mesh.knife_cut` (*type='EXACT', path=None, num_cuts=1, cursor=9*)
Cut selected edges and faces into parts

Parameters

- **type** (*enum in ['EXACT', 'MIDPOINTS', 'MULTICUT'], (optional)*) – Type
- **path** (*bpy_prop_collection of OperatorMousePath, (optional)*) – path
- **num_cuts** (*int in [1, 256], (optional)*) – Number of Cuts, Only for Multi-Cut
- **cursor** (*int in [0, inf], (optional)*) – Cursor

`bpy.ops.mesh.loop_multi_select` (*ring=False*)
Select a loop of connected edges by connection type

Parameters `ring` (*boolean, (optional)*) – Ring

`bpy.ops.mesh.loop_select` (*extend=False, ring=False*)
Select a loop of connected edges

Parameters

- **extend** (*boolean, (optional)*) – Extend Select

- **ring** (*boolean, (optional)*) – Select Ring

`bpy.ops.mesh.loop_to_region()`
Select a loop of connected edges as a region

`bpy.ops.mesh.loopcut(number_cuts=1)`
Add a new loop between existing loops

Parameters `number_cuts` (*int in [1, inf], (optional)*) – Number of Cuts

`bpy.ops.mesh.loopcut_slide(MESH_OT_loopcut=None, TRANSFORM_OT_edge_slide=None)`
Undocumented ([contribute](#))

Parameters

- **MESH_OT_loopcut** (`MESH_OT_loopcut`, (*optional*)) – Loop Cut, Add a new loop between existing loops
- **TRANSFORM_OT_edge_slide** (`TRANSFORM_OT_edge_slide`, (*optional*)) – Edge Slide, Slide an edge loop along a mesh

`bpy.ops.mesh.mark_seam(clear=False)`
(un)mark selected edges as a seam

Parameters `clear` (*boolean, (optional)*) – Clear

`bpy.ops.mesh.mark_sharp(clear=False)`
(un)mark selected edges as sharp

Parameters `clear` (*boolean, (optional)*) – Clear

`bpy.ops.mesh.merge(type='CENTER', uvs=False)`
Merge selected vertices

Parameters

- **type** (*enum in ['FIRST', 'LAST', 'CENTER', 'CURSOR', 'COLLAPSE'], (optional)*) – Type, Merge method to use
- **uvs** (*boolean, (optional)*) – UVs, Move UVs according to merge

`bpy.ops.mesh.noise(factor=0.1)`
Use vertex coordinate as texture coordinate

Parameters `factor` (*float in [-inf, inf], (optional)*) – Factor

`bpy.ops.mesh.normals_make_consistent(inside=False)`
Flip all selected vertex and face normals in a consistent direction

Parameters `inside` (*boolean, (optional)*) – Inside

`bpy.ops.mesh.primitive_circle_add(vertices=32, radius=1.0, fill=False, view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False))`

Construct a circle mesh

Parameters

- **vertices** (*int in [3, inf], (optional)*) – Vertices
- **radius** (*float in [0, inf], (optional)*) – Radius
- **fill** (*boolean, (optional)*) – Fill
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view

- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.mesh.primitive_cone_add(vertices=32, radius=1.0, depth=2.0, cap_end=True,
view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False,
False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))
```

Construct a conic mesh (ends filled)

Parameters

- **vertices** (*int in [2, inf], (optional)*) – Vertices
- **radius** (*float in [0, inf], (optional)*) – Radius
- **depth** (*float in [0, inf], (optional)*) – Depth
- **cap_end** (*boolean, (optional)*) – Cap End
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.mesh.primitive_cube_add(view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False,
False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))
```

Construct a cube mesh

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.mesh.primitive_cylinder_add` (*vertices=32, radius=1.0, depth=2.0, cap_ends=True, view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a cylinder mesh

Parameters

- **vertices** (*int in [2, inf], (optional)*) – Vertices
- **radius** (*float in [0, inf], (optional)*) – Radius
- **depth** (*float in [0, inf], (optional)*) – Depth
- **cap_ends** (*boolean, (optional)*) – Cap Ends
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.mesh.primitive_grid_add` (*x_subdivisions=10, y_subdivisions=10, size=1.0, view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a grid mesh

Parameters

- **x_subdivisions** (*int in [3, inf], (optional)*) – X Subdivisions
- **y_subdivisions** (*int in [3, inf], (optional)*) – Y Subdivisions
- **size** (*float in [0, inf], (optional)*) – Size
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.mesh.primitive_ico_sphere_add` (*subdivisions=2, size=1.0, view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct an Icosphere mesh

Parameters

- **subdivisions** (*int in [1, inf], (optional)*) – Subdivisions
- **size** (*float in [0, inf], (optional)*) – Size
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.mesh.primitive_monkey_add (view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))
```

Construct a Suzanne mesh

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.mesh.primitive_plane_add (view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))
```

Construct a filled planar mesh with 4 vertices

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.mesh.primitive_torus_add (major_radius=1.0, minor_radius=0.25, major_segments=48,  
                                  minor_segments=12, use_abso=False, abso_major_rad=1.0,  
                                  abso_minor_rad=0.5, view_align=False, location=(0.0, 0.0,  
                                  0.0), rotation=(0.0, 0.0, 0.0))
```

Add a torus mesh

Parameters

- **major_radius** (*float in [0.01, 100], (optional)*) – Major Radius, Radius from the origin to the center of the cross sections
- **minor_radius** (*float in [0.01, 100], (optional)*) – Minor Radius, Radius of the torus' cross section
- **major_segments** (*int in [3, 256], (optional)*) – Major Segments, Number of segments for the main ring of the torus
- **minor_segments** (*int in [3, 256], (optional)*) – Minor Segments, Number of segments for the minor ring of the torus
- **use_abso** (*boolean, (optional)*) – Use Int+Ext Controls, Use the Int / Ext controls for torus dimensions
- **abso_major_rad** (*float in [0.01, 100], (optional)*) – Exterior Radius, Total Exterior Radius of the torus
- **abso_minor_rad** (*float in [0.01, 100], (optional)*) – Inside Radius, Total Interior Radius of the torus
- **view_align** (*boolean, (optional)*) – Align to View
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation

File startup/bl_operators/add_mesh_torus.py:148

```
bpy.ops.mesh.primitive_uv_sphere_add (segments=32, ring_count=16, size=1.0,  
                                       view_align=False, enter_editmode=False, loca-  
                                       tion=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), lay-  
                                       ers=(False, False, False, False, False, False, False,  
                                       False, False, False, False, False, False, False,  
                                       False, False, False, False, False))
```

Construct a UV sphere mesh

Parameters

- **segments** (*int in [3, inf], (optional)*) – Segments
- **ring_count** (*int in [3, inf], (optional)*) – Rings
- **size** (*float in [0, inf], (optional)*) – Size
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.mesh.quads_convert_to_tris()`
Convert selected quads to triangles

`bpy.ops.mesh.region_to_loop()`
Select a region as a loop of connected edges

`bpy.ops.mesh.remove_doubles(limit=0.0001)`
Remove duplicate vertices

Parameters `limit` (*float in [1e-06, 50], (optional)*) – Merge Threshold, Minimum distance between merged verts

`bpy.ops.mesh.reveal()`
Reveal all hidden vertices, edges and faces

`bpy.ops.mesh.rip(constraint_axis=(False, False, False), constraint_orientation='', mirror=False, release_confirm=False)`
Rip selection from mesh (quads only)

Parameters

- `constraint_axis` (*boolean array of 3 items, (optional)*) – Constraint Axis
- `constraint_orientation` (*enum in [], (optional)*) – Orientation, Transformation orientation
- `mirror` (*boolean, (optional)*) – Mirror Editing
- `release_confirm` (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.mesh.rip_move(MESH_OT_rip=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- `MESH_OT_rip` (`MESH_OT_rip`, (*optional*)) – Rip, Rip selection from mesh (quads only)
- `TRANSFORM_OT_translate` (`TRANSFORM_OT_translate`, (*optional*)) – Translate, Translate selected items

`bpy.ops.mesh.screw(steps=9, turns=1, center=(0.0, 0.0, 0.0), axis=(0.0, 0.0, 0.0))`
Extrude selected vertices in screw-shaped rotation around the cursor in indicated viewport

Parameters

- `steps` (*int in [0, inf], (optional)*) – Steps, Steps
- `turns` (*int in [0, inf], (optional)*) – Turns, Turns
- `center` (*float array of 3 items in [-inf, inf], (optional)*) – Center, Center in global view space
- `axis` (*float array of 3 items in [-1, 1], (optional)*) – Axis, Axis in global view space

`bpy.ops.mesh.select_all(action='TOGGLE')`
Change selection of all vertices, edges or faces

Parameters `action` (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.mesh.select_axis` (*mode='POSITIVE', axis='X_AXIS'*)

Select all data in the mesh on a single axis

Parameters

- **mode** (*enum in ['POSITIVE', 'NEGATIVE', 'ALIGNED'], (optional)*) – Axis Mode, Axis side to use when selecting
- **axis** (*enum in ['X_AXIS', 'Y_AXIS', 'Z_AXIS'], (optional)*) – Axis, Select the axis to compare each vertex on

`bpy.ops.mesh.select_by_number_vertices` (*type='TRIANGLES'*)

Select vertices or faces by vertex count

Parameters **type** (*enum in ['TRIANGLES', 'QUADS', 'OTHER'], (optional)*) – Type, Type of elements to select

`bpy.ops.mesh.select_inverse` ()

Select inverse of (un)selected vertices, edges or faces

`bpy.ops.mesh.select_less` ()

Select less vertices, edges or faces connected to initial selection

`bpy.ops.mesh.select_linked` (*limit=False*)

Select all vertices linked to the active mesh

Parameters **limit** (*boolean, (optional)*) – Limit by Seams, Limit selection by seam boundaries (faces only)

`bpy.ops.mesh.select_linked_pick` (*deselect=False, limit=False*)

(un)select all vertices linked to the active mesh

Parameters

- **deselect** (*boolean, (optional)*) – Deselect
- **limit** (*boolean, (optional)*) – Limit by Seams, Limit selection by seam boundaries (faces only)

`bpy.ops.mesh.select_mirror` (*extend=False*)

Select mesh items at mirrored locations

Parameters **extend** (*boolean, (optional)*) – Extend, Extend the existing selection

`bpy.ops.mesh.select_more` ()

Select more vertices, edges or faces connected to initial selection

`bpy.ops.mesh.select_non_manifold` ()

Select all non-manifold vertices or edges

`bpy.ops.mesh.select_nth` (*nth=2*)

Undocumented ([contribute](#))

Parameters **nth** (*int in [2, 100], (optional)*) – Nth Selection

`bpy.ops.mesh.select_random` (*percent=50.0, extend=False*)

Randomly select vertices

Parameters

- **percent** (*float in [0, 100], (optional)*) – Percent, Percentage of elements to select randomly
- **extend** (*boolean, (optional)*) – Extend Selection, Extend selection instead of deselecting everything first

`bpy.ops.mesh.select_shortest_path` (*extend=False*)
Select shortest path between two selections

Parameters `extend` (*boolean, (optional)*) – Extend Select

`bpy.ops.mesh.select_similar` (*type='NORMAL', threshold=0.01*)
Select similar vertices, edges or faces by property types

Parameters

- **type** (*enum in ['NORMAL', 'FACE', 'VGROUP', 'LENGTH', 'DIR', 'FACE', 'FACE_ANGLE', 'CREASE', 'SEAM', 'SHARP', 'MATERIAL', 'IMAGE', 'AREA', 'PERIMETER', 'NORMAL', 'COPLANAR'], (optional)*) – Type
- **threshold** (*float in [0, inf], (optional)*) – Threshold

`bpy.ops.mesh.select_vertex_path` (*type='EDGE_LENGTH'*)
Select shortest path between two vertices by distance type

Parameters `type` (*enum in ['EDGE_LENGTH', 'TOPOLOGICAL'], (optional)*) – Type, Method to compute distance

`bpy.ops.mesh.separate` (*type='SELECTED'*)
Separate selected geometry into a new mesh

Parameters `type` (*enum in ['SELECTED', 'MATERIAL', 'LOOSE'], (optional)*) – Type

`bpy.ops.mesh.shape_propagate_to_all` ()
Apply selected vertex locations to all other shape keys

`bpy.ops.mesh.solidify` (*thickness=0.01*)
Create a solid skin by extruding, compensating for sharp angles

Parameters `thickness` (*float in [-inf, inf], (optional)*) – Thickness

`bpy.ops.mesh.sort_faces` (*type='VIEW_AXIS'*)
The faces of the active Mesh Object are sorted, based on the current view

Parameters `type` (*enum in ['VIEW_AXIS', 'CURSOR_DISTANCE', 'MATERIAL', 'SELECTED', 'RANDOMIZE'], (optional)*) – Type

`bpy.ops.mesh.spin` (*steps=9, dupli=False, degrees=90.0, center=(0.0, 0.0, 0.0), axis=(0.0, 0.0, 0.0)*)
Extrude selected vertices in a circle around the cursor in indicated viewport

Parameters

- **steps** (*int in [0, inf], (optional)*) – Steps, Steps
- **dupli** (*boolean, (optional)*) – Dupli, Make Duplicates
- **degrees** (*float in [-inf, inf], (optional)*) – Degrees, Degrees
- **center** (*float array of 3 items in [-inf, inf], (optional)*) – Center, Center in global view space
- **axis** (*float array of 3 items in [-1, 1], (optional)*) – Axis, Axis in global view space

`bpy.ops.mesh.split` ()
Split selected geometry into separate disconnected mesh

`bpy.ops.mesh.sticky_add` ()
Add sticky UV texture layer

`bpy.ops.mesh.sticky_remove` ()
Remove sticky UV texture layer

`bpy.ops.mesh.subdivide` (*number_cuts=1, smoothness=0.0, fractal=0.0, corner_cut_pattern='INNER_VERTEX'*)

Subdivide selected edges

Parameters

- **number_cuts** (*int in [1, inf], (optional)*) – Number of Cuts
- **smoothness** (*float in [0, inf], (optional)*) – Smoothness, Smoothness factor
- **fractal** (*float in [0, inf], (optional)*) – Fractal, Fractal randomness factor
- **corner_cut_pattern** (*enum in ['PATH', 'INNER_VERTEX', 'FAN'], (optional)*) – Corner Cut Pattern, Topology pattern to use to fill a face after cutting across its corner

`bpy.ops.mesh.tris_convert_to_quads` ()

Convert selected triangles to quads

`bpy.ops.mesh.uv_texture_add` ()

Add UV texture layer

`bpy.ops.mesh.uv_texture_remove` ()

Remove UV texture layer

`bpy.ops.mesh.uvs_mirror` (*axis='X'*)

Mirror selected UVs

Parameters *axis* (*enum in ['X', 'Y'], (optional)*) – Axis, Axis to mirror UVs around

`bpy.ops.mesh.uvs_rotate` (*direction='CW'*)

Rotate selected UVs

Parameters *direction* (*enum in ['CW', 'CCW'], (optional)*) – Direction, Direction to rotate UVs around

`bpy.ops.mesh.vertex_color_add` ()

Add vertex color layer

`bpy.ops.mesh.vertex_color_remove` ()

Remove vertex color layer

`bpy.ops.mesh.vertices_randomize` ()

Randomize vertex order

`bpy.ops.mesh.vertices_smooth` (*repeat=1, xaxis=True, yaxis=True, zaxis=True*)

Flatten angles of selected vertices

Parameters

- **repeat** (*int in [1, 100], (optional)*) – Smooth Iterations
- **xaxis** (*boolean, (optional)*) – X-Axis, Smooth along the X axis
- **yaxis** (*boolean, (optional)*) – Y-Axis, Smooth along the Y axis
- **zaxis** (*boolean, (optional)*) – Z-Axis, Smooth along the Z axis

`bpy.ops.mesh.vertices_sort` ()

Sort vertex order

Nla Operators

`bpy.ops.nla.action_sync_length` (*active=True*)

Synchronise the length of the referenced Action with the length used in the strip

Parameters active (*boolean, (optional)*) – Active Strip Only, Only sync the active length for the active strip

`bpy.ops.nla.actionclip_add (action='')`
Add an Action-Clip strip (i.e. an NLA Strip referencing an Action) to the active track

Parameters action (*enum in [], (optional)*) – Action

`bpy.ops.nla.apply_scale ()`
Apply scaling of selected strips to their referenced Actions

`bpy.ops.nla.bake (frame_start=1, frame_end=250, step=1, only_selected=True, clear_constraints=False, bake_types={'POSE'})`
Bake animation to an Action

Parameters

- **frame_start** (*int in [0, 300000], (optional)*) – Start Frame, Start frame for baking
- **frame_end** (*int in [1, 300000], (optional)*) – End Frame, End frame for baking
- **step** (*int in [1, 120], (optional)*) – Frame Step, Frame Step
- **only_selected** (*boolean, (optional)*) – Only Selected
- **clear_constraints** (*boolean, (optional)*) – Clear Constraints
- **bake_types** (*enum set in {'POSE', 'OBJECT'}, (optional)*) – Bake Data

File `startup/bl_operators/anim.py:204`

`bpy.ops.nla.channels_click (extend=False)`
Handle clicks to select NLA channels

Parameters extend (*boolean, (optional)*) – Extend Select

`bpy.ops.nla.clear_scale ()`
Reset scaling of selected strips

`bpy.ops.nla.click_select (extend=False)`
Handle clicks to select NLA Strips

Parameters extend (*boolean, (optional)*) – Extend Select

`bpy.ops.nla.delete ()`
Delete selected strips

`bpy.ops.nla.delete_tracks ()`
Delete selected NLA-Tracks and the strips they contain

`bpy.ops.nla.duplicate (mode='TRANSLATION')`
Duplicate selected NLA-Strips, adding the new strips in new tracks above the originals

Parameters mode (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (optional)*) – Mode

`bpy.ops.nla.fmodifier_add (type='NULL', only_active=False)`
Add a F-Modifier of the specified type to the selected NLA-Strips

Parameters

- **type** (*enum in ['NULL', 'GENERATOR', 'FNGENERATOR', 'ENVELOPE', 'CYCLES', 'NOISE', 'FILTER', 'LIMITS', 'STEPPED'], (optional)*) – Type
- **only_active** (*boolean, (optional)*) – Only Active, Only add a F-Modifier of the specified type to the active strip

`bpy.ops.nla.fmodifier_copy()`
Copy the F-Modifier(s) of the active NLA-Strip

`bpy.ops.nla.fmodifier_paste()`
Add copied F-Modifiers to the selected NLA-Strips

`bpy.ops.nla.meta_add()`
Add new meta-strips incorporating the selected strips

`bpy.ops.nla.meta_remove()`
Separate out the strips held by the selected meta-strips

`bpy.ops.nla.move_down()`
Move selected strips down a track if there's room

`bpy.ops.nla.move_up()`
Move selected strips up a track if there's room

`bpy.ops.nla.mute_toggle()`
Mute or un-mute selected strips

`bpy.ops.nla.properties()`
Toggle display properties panel

`bpy.ops.nla.select_all_toggle(invert=False)`
(De)Select all NLA-Strips

Parameters `invert` (*boolean, (optional)*) – Invert

`bpy.ops.nla.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True, axis_range=False)`
Use box selection to grab NLA-Strips

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **axis_range** (*boolean, (optional)*) – Axis Range

`bpy.ops.nla.select_leftright(mode='CHECK', extend=False)`
Select strips to the left or the right of the current frame

Parameters

- **mode** (*enum in ['CHECK', 'LEFT', 'RIGHT'], (optional)*) – Mode
- **extend** (*boolean, (optional)*) – Extend Select

`bpy.ops.nla.snap(type='CFRA')`
Move start of strips to specified time

Parameters type (*enum in ['CFRA', 'NEAREST_FRAME', 'NEAREST_SECOND', 'NEAREST_MARKER'], (optional)*) – Type

`bpy.ops.nla.soundclip_add()`
Add a strip for controlling when speaker plays its sound clip

`bpy.ops.nla.split()`
Split selected strips at their midpoints

`bpy.ops.nla.swap()`
Swap order of selected strips within tracks

`bpy.ops.nla.tracks_add(above_selected=False)`
Add NLA-Tracks above/after the selected tracks

Parameters above_selected (*boolean, (optional)*) – Above Selected, Add a new NLA Track above every existing selected one

`bpy.ops.nla.transition_add()`
Add a transition strip between two adjacent selected strips

`bpy.ops.nla.tweakmode_enter()`
Enter tweaking mode for the action referenced by the active strip

`bpy.ops.nla.tweakmode_exit()`
Exit tweaking mode for the action referenced by the active strip

`bpy.ops.nla.view_all()`
Reset viewable area to show full strips range

`bpy.ops.nla.view_selected()`
Reset viewable area to show selected strips range

Node Operators

`bpy.ops.node.add_file(filepath="", filter_blender=False, filter_image=True, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, name="Image")`
Add a file node to the current node editor

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders

- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **name** (*string, (optional)*) – Name, Datablock name to assign

`bpy.ops.node.backimage_move()`
Move Node backdrop

`bpy.ops.node.backimage_sample()`
Undocumented ([contribute](#))

`bpy.ops.node.backimage_zoom(factor=1.2)`
Undocumented ([contribute](#))

Parameters **factor** (*float in [0, 10], (optional)*) – Factor

`bpy.ops.node.delete()`
Delete selected nodes

`bpy.ops.node.delete_reconnect()`
Delete nodes; will reconnect nodes as if deletion was muted

`bpy.ops.node.duplicate(keep_inputs=False)`
Duplicate selected nodes

Parameters **keep_inputs** (*boolean, (optional)*) – Keep Inputs, Keep the input links to duplicated nodes

`bpy.ops.node.duplicate_move(NODE_OT_duplicate=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- **NODE_OT_duplicate** (*NODE_OT_duplicate, (optional)*) – Duplicate Nodes, Duplicate selected nodes
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.node.duplicate_move_keep_inputs(NODE_OT_duplicate=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- **NODE_OT_duplicate** (*NODE_OT_duplicate, (optional)*) – Duplicate Nodes, Duplicate selected nodes
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.node.group_edit()`
Edit node group

`bpy.ops.node.group_make()`
Make group from selected nodes

`bpy.ops.node.group_socket_add(in_out='SOCK_IN', name='', type='VALUE')`
Add node group socket

Parameters

- **in_out** (*enum in ['SOCK_IN', 'SOCK_OUT'], (optional)*) – Socket Type, Input or Output
- **name** (*string, (optional)*) – Name, Group socket name

- **type** (*enum in ['VALUE', 'VECTOR', 'RGBA'], (optional)*) – Type, Type of the group socket

`bpy.ops.node.group_socket_move_down` (*index=0, in_out='SOCK_IN'*)
Move down node group socket

Parameters

- **index** (*int in [0, inf], (optional)*) – Index
- **in_out** (*enum in ['SOCK_IN', 'SOCK_OUT'], (optional)*) – Socket Type, Input or Output

`bpy.ops.node.group_socket_move_up` (*index=0, in_out='SOCK_IN'*)
Move up node group socket

Parameters

- **index** (*int in [0, inf], (optional)*) – Index
- **in_out** (*enum in ['SOCK_IN', 'SOCK_OUT'], (optional)*) – Socket Type, Input or Output

`bpy.ops.node.group_socket_remove` (*index=0, in_out='SOCK_IN'*)
Remove a node group socket

Parameters

- **index** (*int in [0, inf], (optional)*) – Index
- **in_out** (*enum in ['SOCK_IN', 'SOCK_OUT'], (optional)*) – Socket Type, Input or Output

`bpy.ops.node.group_ungroup` ()
Ungroup selected nodes

`bpy.ops.node.hide_socket_toggle` ()
Toggle unused node socket display

`bpy.ops.node.hide_toggle` ()
Toggle hiding of selected nodes

`bpy.ops.node.link` ()
Undocumented ([contribute](#))

`bpy.ops.node.link_make` (*replace=False*)
Makes a link between selected output in input sockets

Parameters **replace** (*boolean, (optional)*) – Replace, Replace socket connections with the new links

`bpy.ops.node.link_viewer` ()
Link to viewer node

`bpy.ops.node.links_cut` (*path=None, cursor=9*)
Undocumented ([contribute](#))

Parameters

- **path** (*bpy_prop_collection of OperatorMousePath, (optional)*) – path
- **cursor** (*int in [0, inf], (optional)*) – Cursor

`bpy.ops.node.mute_toggle` ()
Toggle muting of the nodes

`bpy.ops.node.new_node_tree` (*type='COMPOSITING', name="NodeTree"*)
Undocumented ([contribute](#))

Parameters

- **type** (*enum in ['SHADER', 'TEXTURE', 'COMPOSITING'], (optional)*) – Tree Type

- SHADER Shader, Shader nodes.
- TEXTURE Texture, Texture nodes.
- COMPOSITING Compositing, Compositing nodes.

- **name** (*string, (optional)*) – Name

`bpy.ops.node.preview_toggle()`
Toggle preview display for selected nodes

`bpy.ops.node.properties()`
Toggles the properties panel display

`bpy.ops.node.read_fullsamplelayers()`
Undocumented ([contribute](#))

`bpy.ops.node.read_renderlayers()`
Undocumented ([contribute](#))

`bpy.ops.node.render_changed()`
Undocumented ([contribute](#))

`bpy.ops.node.resize()`
Undocumented ([contribute](#))

`bpy.ops.node.select(mouse_x=0, mouse_y=0, extend=False)`
Select the node under the cursor

Parameters

- **mouse_x** (*int in [-inf, inf], (optional)*) – Mouse X
- **mouse_y** (*int in [-inf, inf], (optional)*) – Mouse Y
- **extend** (*boolean, (optional)*) – Extend

`bpy.ops.node.select_all()`
(De)select all nodes

`bpy.ops.node.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True, tweak=False)`
Use box selection to select nodes

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **tweak** (*boolean, (optional)*) – Tweak, Only activate when mouse is not over a node - useful for tweak gesture

`bpy.ops.node.select_link_viewer(NODE_OT_select=None, NODE_OT_link_viewer=None)`
Undocumented ([contribute](#))

Parameters

- **NODE_OT_select** (`NODE_OT_select`, (optional)) – Select, Select the node under the cursor
- **NODE_OT_link_viewer** (`NODE_OT_link_viewer`, (optional)) – Link to Viewer Node, Link to viewer node

`bpy.ops.node.select_linked_from()`
Select nodes linked from the selected ones

`bpy.ops.node.select_linked_to()`
Select nodes linked to the selected ones

`bpy.ops.node.select_same_type()`
Select all the nodes of the same type

`bpy.ops.node.select_same_type_next()`
Select the next node of the same type

`bpy.ops.node.select_same_type_prev()`
Select the prev node of the same type

`bpy.ops.node.show_cyclic_dependencies()`
Sort the nodes and show the cyclic dependencies between the nodes

`bpy.ops.node.view_all()`
Resize view so you can see all nodes

`bpy.ops.node.visibility_toggle(mouse_x=0, mouse_y=0)`
Handle clicks on node header buttons

Parameters

- **mouse_x** (*int in [-inf, inf], (optional)*) – Mouse X
- **mouse_y** (*int in [-inf, inf], (optional)*) – Mouse Y

Object Operators

`bpy.ops.object.add` (*type='EMPTY', view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)
Add an object to the scene

Parameters

- **type** (*enum in ['MESH', 'CURVE', 'SURFACE', 'META', 'FONT', 'ARMATURE', 'LATTICE', 'EMPTY', 'CAMERA', 'LAMP', 'SPEAKER'], (optional)*) – Type
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.add_named` (*linked=False, name="Cube"*)

Add named object

Parameters

- **linked** (*boolean, (optional)*) – Linked, Duplicate object but not object data, linking to the original data
- **name** (*string, (optional)*) – Name, Object name to add

`bpy.ops.object.add_named_cursor` (*name="Cube", VIEW3D_OT_cursor3d=None, OBJECT_OT_add_named=None*)

Undocumented ([contribute](#))

Parameters

- **name** (*string, (optional)*) – Name, Object name to add
- **VIEW3D_OT_cursor3d** (*VIEW3D_OT_cursor3d, (optional)*) – Set 3D Cursor, Set the location of the 3D cursor
- **OBJECT_OT_add_named** (*OBJECT_OT_add_named, (optional)*) – Add Named Object, Add named object

`bpy.ops.object.align` (*bb_quality=True, align_mode='OPT_2', relative_to='OPT_4', align_axis=set()*)

Align Objects

Parameters

- **bb_quality** (*boolean, (optional)*) – High Quality, Enables high quality calculation of the bounding box for perfect results on complex shape meshes with rotation/scale (Slow)
- **align_mode** (*enum in ['OPT_1', 'OPT_2', 'OPT_3'], (optional)*) – Align Mode:
- **relative_to** (*enum in ['OPT_1', 'OPT_2', 'OPT_3', 'OPT_4'], (optional)*) – Relative To:
- **align_axis** (*enum set in {'X', 'Y', 'Z'}, (optional)*) – Align, Align to axis

File [startup/bl_operators/object_align.py:387](#)

`bpy.ops.object.anim_transforms_to_deltas` ()

Convert object animation for normal transforms to delta transforms

File [startup/bl_operators/object.py:701](#)

`bpy.ops.object.armature_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Add an armature object to the scene

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.bake_image()`
Bake image textures of selected objects

`bpy.ops.object.camera_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)
Add a camera object to the scene

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.constraint_add` (*type=''*)
Add a constraint to the active object

Parameters type (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP'], (optional)*) – Type

- CAMERA_SOLVER Camera Solver.
- FOLLOW_TRACK Follow Track.
- COPY_LOCATION Copy Location.
- COPY_ROTATION Copy Rotation.
- COPY_SCALE Copy Scale.
- COPY_TRANSFORMS Copy Transforms.
- LIMIT_DISTANCE Limit Distance.
- LIMIT_LOCATION Limit Location.
- LIMIT_ROTATION Limit Rotation.
- LIMIT_SCALE Limit Scale.
- MAINTAIN_VOLUME Maintain Volume.
- TRANSFORM Transformation.
- CLAMP_TO Clamp To.
- DAMPED_TRACK Damped Track, Tracking by taking the shortest path.
- IK Inverse Kinematics.
- LOCKED_TRACK Locked Track, Tracking along a single axis.
- SPLINE_IK Spline IK.

- STRETCH_TO Stretch To.
- TRACK_TO Track To, Legacy tracking constraint prone to twisting artifacts.
- ACTION Action.
- CHILD_OF Child Of.
- FLOOR Floor.
- FOLLOW_PATH Follow Path.
- PIVOT Pivot.
- RIGID_BODY_JOINT Rigid Body Joint.
- SCRIPT Script.
- SHRINKWRAP Shrinkwrap.

`bpy.ops.object.constraint_add_with_targets` (*type=''*)

Add a constraint to the active object, with target (where applicable) set to the selected Objects/Bones

Parameters *type* (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP']*, (*optional*)) – Type

- CAMERA_SOLVER Camera Solver.
- FOLLOW_TRACK Follow Track.
- COPY_LOCATION Copy Location.
- COPY_ROTATION Copy Rotation.
- COPY_SCALE Copy Scale.
- COPY_TRANSFORMS Copy Transforms.
- LIMIT_DISTANCE Limit Distance.
- LIMIT_LOCATION Limit Location.
- LIMIT_ROTATION Limit Rotation.
- LIMIT_SCALE Limit Scale.
- MAINTAIN_VOLUME Maintain Volume.
- TRANSFORM Transformation.
- CLAMP_TO Clamp To.
- DAMPED_TRACK Damped Track, Tracking by taking the shortest path.
- IK Inverse Kinematics.
- LOCKED_TRACK Locked Track, Tracking along a single axis.
- SPLINE_IK Spline IK.
- STRETCH_TO Stretch To.
- TRACK_TO Track To, Legacy tracking constraint prone to twisting artifacts.
- ACTION Action.

- `CHILD_OF` Child Of.
- `FLOOR` Floor.
- `FOLLOW_PATH` Follow Path.
- `PIVOT` Pivot.
- `RIGID_BODY_JOINT` Rigid Body Joint.
- `SCRIPT` Script.
- `SHRINKWRAP` Shrinkwrap.

`bpy.ops.object.constraints_clear()`
Clear all the constraints for the active Object only

`bpy.ops.object.constraints_copy()`
Copy constraints to other selected objects

`bpy.ops.object.convert(target='MESH', keep_original=False)`
Convert selected objects to another type

Parameters

- **target** (*enum in ['CURVE', 'MESH'], (optional)*) – Target, Type of object to convert to
- **keep_original** (*boolean, (optional)*) – Keep Original, Keep original objects instead of replacing them

`bpy.ops.object.delete(global=False)`
Delete selected objects

Parameters **global** (*boolean, (optional)*) – Delete Globally, Remove object from all scenes

`bpy.ops.object.drop_named_material(name="Material")`
Undocumented ([contribute](#))

Parameters **name** (*string, (optional)*) – Name, Material name to assign

`bpy.ops.object.duplicate(linked=False, mode='TRANSLATION')`
Duplicate selected objects

Parameters

- **linked** (*boolean, (optional)*) – Linked, Duplicate object but not object data, linking to the original data
- **mode** (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (optional)*) – Mode

`bpy.ops.object.duplicate_move(OBJECT_OT_duplicate=None, TRANSFORM_OT_translate=None)`
Undocumented ([contribute](#))

Parameters

- **OBJECT_OT_duplicate** (`OBJECT_OT_duplicate`, (*optional*)) – Duplicate Objects, Duplicate selected objects
- **TRANSFORM_OT_translate** (`TRANSFORM_OT_translate`, (*optional*)) – Translate, Translate selected items

`bpy.ops.object.duplicate_move_linked` (*OBJECT_OT_duplicate=None, TRANSFORM_OT_translate=None*)

Undocumented (contribute)

Parameters

- **OBJECT_OT_duplicate** (*OBJECT_OT_duplicate, (optional)*) – Duplicate Objects, Duplicate selected objects
- **TRANSFORM_OT_translate** (*TRANSFORM_OT_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.object.duplicates_make_real` (*use_base_parent=False, use_hierarchy=False*)

Make dupli objects attached to this object real

Parameters

- **use_base_parent** (*boolean, (optional)*) – Parent, Parent newly created objects to the original duplicator
- **use_hierarchy** (*boolean, (optional)*) – Keep Hierarchy, Maintain parent child relationships

`bpy.ops.object.editmode_toggle` ()

Toggle object's editmode

`bpy.ops.object.effector_add` (*type='FORCE', view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Add an empty object with a physics effector to the scene

Parameters

- **type** (*enum in ['FORCE', 'WIND', 'VORTEX', 'MAGNET', 'HARMONIC', 'CHARGE', 'LENNARDJ', 'TEXTURE', 'GUIDE', 'BOID', 'TURBULENCE', 'DRAG'], (optional)*) – Type
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.explode_refresh` (*modifier=""*)

Refresh data in the Explode modifier

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.forcefield_toggle` ()

Toggle object's force field

`bpy.ops.object.game_property_clear` ()

Undocumented (contribute)

`bpy.ops.object.game_property_copy` (*operation='COPY', property=''*)

Undocumented (contribute)

Parameters

- **operation** (*enum in ['REPLACE', 'MERGE', 'COPY'], (optional)*) – Operation
- **property** (*enum in [], (optional)*) – Property, Properties to copy

`bpy.ops.object.game_property_new()`
Create a new property available to the game engine

`bpy.ops.object.game_property_remove(index=0)`
Remove game property

Parameters `index` (*int in [0, inf], (optional)*) – Index, Property index to remove

`bpy.ops.object.group_add()`
Add an object to a new group

`bpy.ops.object.group_instance_add(group='', view_align=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))`

Add a dupligroup instance

Parameters

- **group** (*enum in [], (optional)*) – Group
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.group_link(group='')`
Add an object to an existing group

Parameters `group` (*enum in [], (optional)*) – Group

`bpy.ops.object.group_remove()`
Undocumented (`contribute`)

`bpy.ops.object.hide_render_clear()`
Reveal the render object by setting the hide render flag

`bpy.ops.object.hide_render_clear_all()`
Reveal all render objects by setting the hide render flag

File `startup/bl_operators/object.py:684`

`bpy.ops.object.hide_render_set(unselected=False)`
Hide the render object by setting the hide render flag

Parameters `unselected` (*boolean, (optional)*) – Unselected, Hide unselected rather than selected objects

`bpy.ops.object.hide_view_clear()`
Reveal the object by setting the hide flag

`bpy.ops.object.hide_view_set(unselected=False)`
Hide the object by setting the hide flag

Parameters `unselected` (*boolean, (optional)*) – Unselected, Hide unselected rather than selected objects

`bpy.ops.object.hook_add_newob()`
Hook selected vertices to the first selected Object

`bpy.ops.object.hook_add_selob()`
Hook selected vertices to the first selected Object

`bpy.ops.object.hook_assign(modifier='')`
Assign the selected vertices to a hook

Parameters `modifier` (*enum in [], (optional)*) – Modifier, Modifier number to assign to

`bpy.ops.object.hook_recenter(modifier='')`
Set hook center to cursor position

Parameters `modifier` (*enum in [], (optional)*) – Modifier, Modifier number to assign to

`bpy.ops.object.hook_remove(modifier='')`
Remove a hook from the active object

Parameters `modifier` (*enum in [], (optional)*) – Modifier, Modifier number to remove

`bpy.ops.object.hook_reset(modifier='')`
Recalculate and clear offset transformation

Parameters `modifier` (*enum in [], (optional)*) – Modifier, Modifier number to assign to

`bpy.ops.object.hook_select(modifier='')`
Select affected vertices on mesh

Parameters `modifier` (*enum in [], (optional)*) – Modifier, Modifier number to remove

`bpy.ops.object.isolate_type_render()`
Hide unselected render objects of same type as active by setting the hide render flag

File `startup/bl_operators/object.py:664`

`bpy.ops.object.join()`
Join selected objects into active object

`bpy.ops.object.join_shapes()`
Merge selected objects to shapes of active object

`bpy.ops.object.join_uv()`
Copy UV Layout to objects with matching geometry

File `startup/bl_operators/object.py:578`

`bpy.ops.object.lamp_add(type='POINT', view_align=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))`

Add a lamp object to the scene

Parameters

- **type** (*enum in ['POINT', 'SUN', 'SPOT', 'HEMI', 'AREA'], (optional)*) – Type
 - POINT Point, Omnidirectional point light source.
 - SUN Sun, Constant direction parallel ray light source.
 - SPOT Spot, Directional cone light source.
 - HEMI Hemi, 180 degree constant light source.
 - AREA Area, Directional area light source.

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.location_clear()`
Clear the object's location

`bpy.ops.object.logic_bricks_copy()`
Copy logic bricks to other selected objects

`bpy.ops.object.make_dupli_face()`
Make linked objects into dupli-faces

File `startup/bl_operators/object.py:652`

`bpy.ops.object.make_links_data(type='OBDATA')`
Make links from the active object to other selected objects

Parameters `type` (*enum in ['OBDATA', 'MATERIAL', 'ANIMATION', 'DUPLIGROUP', 'MODIFIERS'], (optional)*) – Type

`bpy.ops.object.make_links_scene(scene='')`
Link selection to another scene

Parameters `scene` (*enum in [], (optional)*) – Scene

`bpy.ops.object.make_local(type='SELECTED_OBJECTS')`
Make library linked datablocks local to this file

Parameters `type` (*enum in ['SELECTED_OBJECTS', 'SELECTED_OBJECTS_DATA', 'ALL'], (optional)*) – Type

`bpy.ops.object.make_single_user(type='SELECTED_OBJECTS', object=False, obdata=False, material=False, texture=False, animation=False)`
Make linked data local to each object

Parameters

- **type** (*enum in ['SELECTED_OBJECTS', 'ALL'], (optional)*) – Type
- **object** (*boolean, (optional)*) – Object, Make single user objects
- **obdata** (*boolean, (optional)*) – Object Data, Make single user object data
- **material** (*boolean, (optional)*) – Materials, Make materials local to each datablock
- **texture** (*boolean, (optional)*) – Textures, Make textures local to each material
- **animation** (*boolean, (optional)*) – Object Animation, Make animation data local to each object

`bpy.ops.object.material_slot_add()`
Add a new material slot

`bpy.ops.object.material_slot_assign()`
Assign the material in the selected material slot to the selected vertices

`bpy.ops.object.material_slot_copy()`
Copies materials to other selected objects

`bpy.ops.object.material_slot_deselect()`
Deselect vertices assigned to the selected material slot

`bpy.ops.object.material_slot_remove()`
Remove the selected material slot

`bpy.ops.object.material_slot_select()`
Select vertices assigned to the selected material slot

`bpy.ops.object.meshdeform_bind(modifier="")`
Bind mesh to cage in mesh deform modifier

Parameters `modifier` (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.metaball_add(type='BALL', view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False))`

Add an metaball object to the scene

Parameters

- **type** (*enum in ['BALL', 'CAPSULE', 'PLANE', 'ELLIPSOID', 'CUBE'], (optional)*) – Primitive
- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.mode_set(mode='OBJECT', toggle=False)`
Sets the object interaction mode

Parameters

- **mode** (*enum in ['OBJECT', 'EDIT', 'SCULPT', 'VERTEX_PAINT', 'WEIGHT_PAINT', 'TEXTURE_PAINT', 'PARTICLE_EDIT', 'POSE'], (optional)*) – Mode
- **toggle** (*boolean, (optional)*) – Toggle

`bpy.ops.object.modifier_add(type='SUBSURF')`
Add a modifier to the active object

Parameters `type` (*enum in ['UV_PROJECT', 'VERTEX_WEIGHT_EDIT', 'VERTEX_WEIGHT_MIX', 'VERTEX_WEIGHT_PROXIMITY', 'ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SO-LIDIFY', 'SUBSURF', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH_DEFORM', 'SHRINKWRAP', 'SIMPLE_DEFORM', 'SMOOTH', 'WARP', 'WAVE', 'CLOTH', 'COLLISION', 'DYNAMIC_PAINT', 'EXPLODE', 'FLUID_SIMULATION', 'OCEAN', 'PARTICLE_INSTANCE', 'PARTICLE_SYSTEM', 'SMOKE', 'SOFT_BODY', 'SURFACE'], (optional)*) – Type

`bpy.ops.object.modifier_apply(apply_as='DATA', modifier="")`
Apply modifier and remove from the stack

Parameters

- **apply_as** (*enum in ['DATA', 'SHAPE'], (optional)*) – Apply as, How to apply the modifier to the geometry
 - DATA Object Data, Apply modifier to the object’s data.
 - SHAPE New Shape, Apply deform-only modifier to a new shape on this object.
- **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.modifier_convert` (*modifier=""*)
Convert particles to a mesh object

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.modifier_copy` (*modifier=""*)
Duplicate modifier at the same position in the stack

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.modifier_move_down` (*modifier=""*)
Move modifier down in the stack

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.modifier_move_up` (*modifier=""*)
Move modifier up in the stack

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.modifier_remove` (*modifier=""*)
Remove a modifier from the active object

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.move_to_layer` (*layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)
Move the object to different layers

Parameters **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.multires_base_apply` (*modifier=""*)
Modify the base mesh to conform to the displaced mesh

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.multires_external_pack` ()
Pack displacements from an external file

`bpy.ops.object.multires_external_save` (*filepath="", check_existing=True, filter_blender=False, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=True, filter_collada=False, filter_folder=True, filemode=9, relative_path=True, modifier=""*)

Save displacements to an external file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files

- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.multires_higher_levels_delete (modifier="")`

Deletes the higher resolution mesh, potential loss of detail

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.multires_reshape (modifier="")`

Copy vertex coordinates from other object

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.multires_subdivide (modifier="")`

Add a new level of subdivision

Parameters **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit

`bpy.ops.object.ocean_bake (modifier="", free=False)`

Bake an image sequence of ocean data

Parameters

- **modifier** (*string, (optional)*) – Modifier, Name of the modifier to edit
- **free** (*boolean, (optional)*) – Free, Free the bake, rather than generating it

`bpy.ops.object.origin_clear ()`

Clear the object's origin

`bpy.ops.object.origin_set (type='GEOMETRY_ORIGIN', center='MEDIAN')`

Set the object's origin, by either moving the data, or set to center of data, or use 3d cursor

Parameters

- **type** (*enum in ['GEOMETRY_ORIGIN', 'ORIGIN_GEOMETRY', 'ORIGIN_CURSOR'], (optional)*) – Type
 - `GEOMETRY_ORIGIN` Geometry to Origin, Move object geometry to object origin.
 - `ORIGIN_GEOMETRY` Origin to Geometry, Move object origin to center of object geometry.
 - `ORIGIN_CURSOR` Origin to 3D Cursor, Move object origin to position of the 3d cursor.
- **center** (*enum in ['MEDIAN', 'BOUNDS'], (optional)*) – Center

`bpy.ops.object.parent_clear` (*type*='CLEAR')
Clear the object's parenting

Parameters *type* (*enum in* ['CLEAR', 'CLEAR_KEEP_TRANSFORM', 'CLEAR_INVERSE'], (*optional*)) – Type

`bpy.ops.object.parent_no_inverse_set` ()
Set the object's parenting without setting the inverse parent correction

`bpy.ops.object.parent_set` (*type*='OBJECT')
Set the object's parenting

Parameters *type* (*enum in* ['OBJECT', 'ARMATURE', 'ARMATURE_NAME', 'ARMATURE_AUTO', 'ARMATURE_ENVELOPE', 'BONE', 'CURVE', 'FOLLOW', 'PATH_CONST', 'LATTICE', 'VERTEX', 'TRIA'], (*optional*)) – Type

`bpy.ops.object.particle_system_add` ()
Add a particle system

`bpy.ops.object.particle_system_remove` ()
Remove the selected particle system

`bpy.ops.object.paths_calculate` ()
Calculate paths for the selected bones

`bpy.ops.object.paths_clear` ()
Clear path caches for selected bones

`bpy.ops.object.posemode_toggle` ()
Enable or disable posing/selecting bones

`bpy.ops.object.proxy_make` (*object*="", *type*='DEFAULT')
Add empty object to become local replacement data of a library-linked object

Parameters

- **object** (*string, optional*) – Proxy Object, Name of lib-linked/grouped object to make a proxy for
- **type** (*enum in* ['DEFAULT'], (*optional*)) – Type, Group object

`bpy.ops.object.quick_explode` (*style*='EXPLODE', *amount*=100, *frame_duration*=50, *frame_start*=1, *frame_end*=10, *velocity*=1.0, *fade*=True)

Undocumented ([contribute](#))

Parameters

- **style** (*enum in* ['EXPLODE', 'BLEND'], (*optional*)) – Explode Style
- **amount** (*int in* [2, 10000], (*optional*)) – Amount of pieces
- **frame_duration** (*int in* [1, 300000], (*optional*)) – Duration
- **frame_start** (*int in* [1, 300000], (*optional*)) – Start Frame
- **frame_end** (*int in* [1, 300000], (*optional*)) – End Frame
- **velocity** (*float in* [0, 300000], (*optional*)) – Outwards Velocity
- **fade** (*boolean, optional*) – Fade, Fade the pieces over time

File `startup/bl_operators/object_quick_effects.py:163`

`bpy.ops.object.quick_fluid` (*style*='BASIC', *initial_velocity*=(0.0, 0.0, 0.0), *show_flows*=False, *start_baking*=False)

Undocumented ([contribute](#))

Parameters

- **style** (*enum in ['INFLOW', 'BASIC'], (optional)*) – Fluid Style
- **initial_velocity** (*float array of 3 items in [-100, 100], (optional)*) – Initial Velocity, Initial velocity of the fluid
- **show_flows** (*boolean, (optional)*) – Render Fluid Objects, Keep the fluid objects visible during rendering
- **start_baking** (*boolean, (optional)*) – Start Fluid Bake, Start baking the fluid immediately after creating the domain object

File [startup/bl_operators/object_quick_effects.py:440](#)

`bpy.ops.object.quick_fur` (*density='MEDIUM', view_percentage=10, length=0.1*)
Undocumented ([contribute](#))

Parameters

- **density** (*enum in ['LIGHT', 'MEDIUM', 'HEAVY'], (optional)*) – Fur Density
- **view_percentage** (*int in [1, 100], (optional)*) – View %
- **length** (*float in [0.001, 100], (optional)*) – Length

File [startup/bl_operators/object_quick_effects.py:74](#)

`bpy.ops.object.quick_smoke` (*style='STREAM', show_flows=False*)
Undocumented ([contribute](#))

Parameters

- **style** (*enum in ['STREAM', 'PUFF', 'FIRE'], (optional)*) – Smoke Style
- **show_flows** (*boolean, (optional)*) – Render Smoke Objects, Keep the smoke objects visible during rendering

File [startup/bl_operators/object_quick_effects.py:313](#)

`bpy.ops.object.randomize_transform` (*random_seed=0, use_delta=False, use_loc=True, loc=(0.0, 0.0, 0.0), use_rot=True, rot=(0.0, 0.0, 0.0), use_scale=True, scale_even=False, scale=(0.0, 0.0, 0.0)*)

Randomize objects loc/rot/scale

Parameters

- **random_seed** (*int in [0, 1000], (optional)*) – Random Seed, Seed value for the random generator
- **use_delta** (*boolean, (optional)*) – Transform Delta, Randomize delta transform values instead of regular transform
- **use_loc** (*boolean, (optional)*) – Randomize Location, Randomize the location values
- **loc** (*float array of 3 items in [-100, 100], (optional)*) – Location, Maximum distance the objects can spread over each axis
- **use_rot** (*boolean, (optional)*) – Randomize Rotation, Randomize the rotation values
- **rot** (*float array of 3 items in [-180, 180], (optional)*) – Rotation, Maximum rotation over each axis
- **use_scale** (*boolean, (optional)*) – Randomize Scale, Randomize the scale values
- **scale_even** (*boolean, (optional)*) – Scale Even, Use the same scale value for all axis

- **scale** (*float array of 3 items in [-100, 100], (optional)*) – Scale, Maximum scale randomization over each axis

File `startup/bl_operators/object_randomize_transform.py:164`

`bpy.ops.object.rotation_clear()`
Clear the object's rotation

`bpy.ops.object.scale_clear()`
Clear the object's scale

`bpy.ops.object.select_all(action='TOGGLE')`
Change selection of all visible objects in scene

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.object.select_by_layer(extend=False, layers=1)`
Select all visible objects on a layer

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **layers** (*int in [1, 20], (optional)*) – Layer

`bpy.ops.object.select_by_type(extend=False, type='MESH')`
Select all visible objects that are of a type

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **type** (*enum in ['MESH', 'CURVE', 'SURFACE', 'META', 'FONT', 'ARMATURE', 'LATTICE', 'EMPTY', 'CAMERA', 'LAMP', 'SPEAKER'], (optional)*) – Type

`bpy.ops.object.select_camera()`
Select object matching a naming pattern

File `startup/bl_operators/object.py:113`

`bpy.ops.object.select_grouped(extend=False, type='CHILDREN_RECURSIVE')`
Select all visible objects grouped by various properties

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **type** (*enum in ['CHILDREN_RECURSIVE', 'CHILDREN', 'PARENT', 'SIBLINGS', 'TYPE', 'LAYER', 'GROUP', 'HOOK', 'PASS', 'COLOR', 'PROPERTIES', 'KEYINGSET'], (optional)*) – Type
 - CHILDREN_RECURSIVE Children.
 - CHILDREN Immediate Children.

- PARENT Parent.
- SIBLINGS Siblings, Shared Parent.
- TYPE Type, Shared object type.
- LAYER Layer, Shared layers.
- GROUP Group, Shared group.
- HOOK Hook.
- PASS Pass, Render pass Index.
- COLOR Color, Object Color.
- PROPERTIES Properties, Game Properties.
- KEYINGSET Keying Set, Objects included in active Keying Set.

`bpy.ops.object.select_hierarchy` (*direction='PARENT', extend=False*)
Select object relative to the active object's position in the hierarchy

Parameters

- **direction** (*enum in ['PARENT', 'CHILD'], (optional)*) – Direction, Direction to select in the hierarchy
- **extend** (*boolean, (optional)*) – Extend, Extend the existing selection

File `startup/bl_operators/object.py:149`

`bpy.ops.object.select_inverse` ()
Invert selection of all visible objects

`bpy.ops.object.select_linked` (*extend=False, type='OBDATA'*)
Select all visible objects that are linked

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **type** (*enum in ['OBDATA', 'MATERIAL', 'TEXTURE', 'DUPGROUP', 'PARTICLE', 'LIBRARY', 'LIBRARY_OBDATA'], (optional)*) – Type

`bpy.ops.object.select_mirror` (*extend=False*)
Select the Mirror objects of the selected object eg. L.sword -> R.sword

Parameters **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.object.select_name` (*name="" , extend=False*)
Select an object with this name

Parameters

- **name** (*string, (optional)*) – Name, Object name to select
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.object.select_pattern` (*pattern="**", case_sensitive=False, extend=True*)
Select object matching a naming pattern

Parameters

- **pattern** (*string, (optional)*) – Pattern, Name filter using '*' and '?' wildcard chars

- **case_sensitive** (*boolean, (optional)*) – Case Sensitive, Do a case sensitive compare
- **extend** (*boolean, (optional)*) – Extend, Extend the existing selection

File `startup/bl_operators/object.py:49`

`bpy.ops.object.select_random(percent=50.0, extend=False)`
Set select on random visible objects

Parameters

- **percent** (*float in [0, 100], (optional)*) – Percent, Percentage of objects to select randomly
- **extend** (*boolean, (optional)*) – Extend Selection, Extend selection instead of deselecting everything first

`bpy.ops.object.select_same_group(group="")`
Select object in the same group

Parameters **group** (*string, (optional)*) – Group, Name of the group to select

`bpy.ops.object.shade_flat()`
Display faces 'flat'

`bpy.ops.object.shade_smooth()`
Display faces 'smooth' (using vertex normals)

`bpy.ops.object.shape_key_add(from_mix=True)`
Add shape key to the object

Parameters **from_mix** (*boolean, (optional)*) – From Mix, Create the new shape key from the existing mix of keys

`bpy.ops.object.shape_key_clear()`
Clear weights for all shape keys

`bpy.ops.object.shape_key_mirror()`
Undocumented ([contribute](#))

`bpy.ops.object.shape_key_move(type='UP')`
Undocumented ([contribute](#))

Parameters **type** (*enum in ['UP', 'DOWN'], (optional)*) – Type

`bpy.ops.object.shape_key_remove()`
Remove shape key from the object

`bpy.ops.object.shape_key_transfer(mode='OFFSET', use_clamp=False)`
Copy another selected objects active shape to this one by applying the relative offsets

Parameters

- **mode** (*enum in ['OFFSET', 'RELATIVE_FACE', 'RELATIVE_EDGE'], (optional)*) – Transformation Mode, Relative shape positions to the new shape method
 - `OFFSET` Offset, Apply the relative positional offset.
 - `RELATIVE_FACE` Relative Face, Calculate relative position (using faces).
 - `RELATIVE_EDGE` Relative Edge, Calculate relative position (using edges).
- **use_clamp** (*boolean, (optional)*) – Clamp Offset, Clamp the transformation to the distance each vertex moves in the original shape

File `startup/bl_operators/object.py:491`

`bpy.ops.object.slow_parent_clear()`

Clear the object's slow parent

`bpy.ops.object.slow_parent_set()`

Set the object's slow parent

`bpy.ops.object.speaker_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Add a speaker object to the scene

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.subdivision_set` (*level=1, relative=False*)

Sets a Subdivision Surface Level (1-5)

Parameters

- **level** (*int in [-100, 100], (optional)*) – Level
- **relative** (*boolean, (optional)*) – Relative, Apply the subsurf level as an offset relative to the current level

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`bpy.ops.object.text_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Add a text object to the scene

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.object.track_clear` (*type='CLEAR'*)

Clear tracking constraint or flag from object

Parameters **type** (*enum in ['CLEAR', 'CLEAR_KEEP_TRANSFORM'], (optional)*) – Type

`bpy.ops.object.track_set` (*type='DAMPTRACK'*)

Make the object track another object, either by constraint or old way or locked track

Parameters *type* (*enum in ['DAMPTRACK', 'TRACKTO', 'LOCKTRACK'], (optional)*) – Type

`bpy.ops.object.transform_apply` (*location=False, rotation=False, scale=False*)

Apply the object's transformation to its data

Parameters

- **location** (*boolean, (optional)*) – Location
- **rotation** (*boolean, (optional)*) – Rotation
- **scale** (*boolean, (optional)*) – Scale

`bpy.ops.object.vertex_group_add` ()

Undocumented ([contribute](#))

`bpy.ops.object.vertex_group_assign` (*new=False*)

Undocumented ([contribute](#))

Parameters *new* (*boolean, (optional)*) – New, Assign vertex to new vertex group

`bpy.ops.object.vertex_group_blend` ()

Undocumented ([contribute](#))

`bpy.ops.object.vertex_group_clean` (*limit=0.01, all_groups=False, keep_single=False*)

Remove Vertex Group assignments which aren't required

Parameters

- **limit** (*float in [0, 1], (optional)*) – Limit, Remove weights under this limit
- **all_groups** (*boolean, (optional)*) – All Groups, Clean all vertex groups
- **keep_single** (*boolean, (optional)*) – Keep Single, Keep verts assigned to at least one group when cleaning

`bpy.ops.object.vertex_group_copy` ()

Undocumented ([contribute](#))

`bpy.ops.object.vertex_group_copy_to_linked` ()

Copy Vertex Groups to all users of the same Geometry data

`bpy.ops.object.vertex_group_copy_to_selected` ()

Copy Vertex Groups to other selected objects with matching indices

`bpy.ops.object.vertex_group_deselect` ()

Undocumented ([contribute](#))

`bpy.ops.object.vertex_group_fix` (*dist=0.0, strength=1.0, accuracy=1.0*)

Modify the position of selected vertices by changing only their respective groups' weights (this tool may be slow for many vertices)

Parameters

- **dist** (*float in [-inf, inf], (optional)*) – Distance, The distance to move to
- **strength** (*float in [-2, inf], (optional)*) – Strength, The distance moved can be changed by this multiplier
- **accuracy** (*float in [0.05, inf], (optional)*) – Change Sensitivity, Change the amount weights are altered with each iteration: lower values are slower

`bpy.ops.object.vertex_group_invert` (*auto_assign=True, auto_remove=True*)
Undocumented (contribute)

Parameters

- **auto_assign** (*boolean, (optional)*) – Add Weights, Add verts from groups that have zero weight before inverting
- **auto_remove** (*boolean, (optional)*) – Remove Weights, Remove verts from groups that have zero weight after inverting

`bpy.ops.object.vertex_group_levels` (*offset=0.0, gain=1.0*)
Undocumented (contribute)

Parameters

- **offset** (*float in [-1, 1], (optional)*) – Offset, Value to add to weights
- **gain** (*float in [0, inf], (optional)*) – Gain, Value to multiply weights by

`bpy.ops.object.vertex_group_lock` (*action='TOGGLE'*)
Undocumented (contribute)

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.object.vertex_group_mirror` (*mirror_weights=True, flip_group_names=True, all_groups=False*)

Mirror all vertex groups, flip weights and/or names, editing only selected vertices, flipping when both sides are selected otherwise copy from unselected

Parameters

- **mirror_weights** (*boolean, (optional)*) – Mirror Weights, Mirror weights
- **flip_group_names** (*boolean, (optional)*) – Flip Groups, Flip vertex group names
- **all_groups** (*boolean, (optional)*) – All Groups, Mirror all vertex groups weights

`bpy.ops.object.vertex_group_move` (*direction='UP'*)
Undocumented (contribute)

Parameters **direction** (*enum in ['UP', 'DOWN'], (optional)*) – Direction, Direction to move, UP or DOWN

`bpy.ops.object.vertex_group_normalize` ()
Undocumented (contribute)

`bpy.ops.object.vertex_group_normalize_all` (*lock_active=True*)
Undocumented (contribute)

Parameters **lock_active** (*boolean, (optional)*) – Lock Active, Keep the values of the active group while normalizing others

`bpy.ops.object.vertex_group_remove` (*all=False*)
Undocumented (contribute)

Parameters **all** (*boolean, (optional)*) – All, Remove from all vertex groups

`bpy.ops.object.vertex_group_remove_from` (*all=False*)
Undocumented (contribute)

Parameters `all` (*boolean, (optional)*) – All, Remove from all vertex groups

`bpy.ops.object.vertex_group_select` ()
Undocumented (contribute)

`bpy.ops.object.vertex_group_set_active` (*group=''*)
Set the active vertex group

Parameters `group` (*enum in [], (optional)*) – Group, Vertex group to set as active

`bpy.ops.object.vertex_group_sort` ()
Sorts vertex groups alphabetically

`bpy.ops.object.vertex_parent_set` ()
Parent selected objects to the selected vertices

`bpy.ops.object.visual_transform_apply` ()
Apply the object's visual transformation to its data

Outliner Operators

`bpy.ops.outliner.action_set` (*action=''*)
Change the active action used

Parameters `action` (*enum in [], (optional)*) – Action

`bpy.ops.outliner.animdata_operation` (*type='SET_ACT'*)
Undocumented (contribute)

Parameters `type` (*enum in ['SET_ACT', 'CLEAR_ACT', 'REFRESH_DRIVERS', 'CLEAR_DRIVERS'], (optional)*) – Animation Operation

`bpy.ops.outliner.data_operation` (*type='SELECT'*)
Undocumented (contribute)

Parameters `type` (*enum in ['SELECT', 'DESELECT', 'HIDE', 'UNHIDE'], (optional)*) – Data Operation

`bpy.ops.outliner.drivers_add_selected` ()
Add drivers to selected items

`bpy.ops.outliner.drivers_delete_selected` ()
Delete drivers assigned to selected items

`bpy.ops.outliner.expanded_toggle` ()
Expand/Collapse all items

`bpy.ops.outliner.group_operation` (*type='UNLINK'*)
Undocumented (contribute)

Parameters `type` (*enum in ['UNLINK', 'LOCAL', 'LINK', 'TOGVIS', 'TOGSEL', 'TOGREN', 'RENAME'], (optional)*) – Group Operation

`bpy.ops.outliner.id_operation` (*type='UNLINK'*)
Undocumented (contribute)

Parameters `type` (*enum in ['UNLINK', 'LOCAL', 'SINGLE', 'ADD_FAKE', 'CLEAR_FAKE', 'RENAME'], (optional)*) – ID data Operation

- UNLINK Unlink.

- LOCAL Make Local.
- SINGLE Make Single User.
- ADD_FAKE Add Fake User, Ensure datablock gets saved even if it isn't in use (e.g. for motion and material libraries).
- CLEAR_FAKE Clear Fake User.
- RENAME Rename.

`bpy.ops.outliner.item_activate` (*extend=True*)
Handle mouse clicks to activate/select items

Parameters `extend` (*boolean, (optional)*) – Extend, Extend selection for activation

`bpy.ops.outliner.item_openclose` (*all=True*)
Toggle whether item under cursor is enabled or closed

Parameters `all` (*boolean, (optional)*) – All, Close or open all items

`bpy.ops.outliner.item_rename` ()
Rename item under cursor

`bpy.ops.outliner.keyingset_add_selected` ()
Add selected items (blue-grey rows) to active Keying Set

`bpy.ops.outliner.keyingset_remove_selected` ()
Remove selected items (blue-grey rows) from active Keying Set

`bpy.ops.outliner.object_operation` (*type='SELECT'*)
Undocumented ([contribute](#))

Parameters `type` (*enum in ['SELECT', 'DESELECT', 'DELETE', 'TOGVIS', 'TOGSEL', 'TOGREN', 'RENAME'], (optional)*) – Object Operation

`bpy.ops.outliner.operation` ()
Context menu for item operations

`bpy.ops.outliner.renderability_toggle` ()
Toggle the renderability of selected items

`bpy.ops.outliner.scroll_page` (*up=False*)
Scroll page up or down

Parameters `up` (*boolean, (optional)*) – Up, Scroll up one page

`bpy.ops.outliner.selectability_toggle` ()
Toggle the selectability

`bpy.ops.outliner.selected_toggle` ()
Toggle the Outliner selection of items

`bpy.ops.outliner.show_active` ()
Adjust the view so that the active Object is shown centered

`bpy.ops.outliner.show_hierarchy` ()
Open all object entries and close all others

`bpy.ops.outliner.show_one_level` (*open=True*)
Expand/collapse all entries by one level

Parameters `open` (*boolean, (optional)*) – Open, Expand all entries one level deep

`bpy.ops.outliner.visibility_toggle` ()
Toggle the visibility of selected items

Paint Operators

`bpy.ops.paint.clone_cursor_set` (*location*=(0.0, 0.0, 0.0))
Undocumented ([contribute](#))

Parameters *location* (*float array of 3 items in [-inf, inf], (optional)*) – Location, Cursor location in world space coordinates

`bpy.ops.paint.face_select_all` (*action*='TOGGLE')
Change selection for all faces

Parameters *action* (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.paint.face_select_hide` (*unselected*=False)
Hide selected faces

Parameters *unselected* (*boolean, (optional)*) – Unselected, Hide unselected rather than selected objects

`bpy.ops.paint.face_select_inverse` ()
Invert selection of faces

`bpy.ops.paint.face_select_linked` ()
Select linked faces

`bpy.ops.paint.face_select_linked_pick` (*extend*=False)
Select linked faces

Parameters *extend* (*boolean, (optional)*) – Extend, Extend the existing selection

`bpy.ops.paint.face_select_reveal` (*unselected*=False)
Reveal hidden faces

Parameters *unselected* (*boolean, (optional)*) – Unselected, Hide unselected rather than selected objects

`bpy.ops.paint.grab_clone` (*delta*=(0.0, 0.0))
Undocumented ([contribute](#))

Parameters *delta* (*float array of 2 items in [-inf, inf], (optional)*) – Delta, Delta offset of clone image in 0.0..1.0 coordinates

`bpy.ops.paint.image_from_view` (*filepath*=""")
Make an image from the current 3D view for re-projection

Parameters *filepath* (*string, (optional)*) – File Path, Name of the file

`bpy.ops.paint.image_paint` (*stroke*=None)
Undocumented ([contribute](#))

Parameters *stroke* (*bpy_prop_collection of OperatorStrokeElement, (optional)*) – Stroke

`bpy.ops.paint.project_image` (*image*='')
Project an edited render from the active camera back onto the object

Parameters image (*enum in [], (optional)*) – Image

`bpy.ops.paint.sample_color` (*location=(0, 0)*)
Undocumented ([contribute](#))

Parameters location (*int array of 2 items in [0, inf], (optional)*) – Location, Cursor location in region coordinates

`bpy.ops.paint.texture_paint_toggle` ()
Undocumented ([contribute](#))

`bpy.ops.paint.vert_select_all` (*action='TOGGLE'*)
Change selection for all vertices

Parameters action (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.paint.vert_select_inverse` ()
Invert selection of vertices

`bpy.ops.paint.vertex_color_dirt` (*blur_strength=1.0, blur_iterations=1, clean_angle=180.0, dirt_angle=0.0, dirt_only=False*)
Undocumented ([contribute](#))

Parameters

- **blur_strength** (*float in [0.01, 1], (optional)*) – Blur Strength, Blur strength per iteration
- **blur_iterations** (*int in [0, 40], (optional)*) – Blur Iterations, Number of times to blur the colors (higher blurs more)
- **clean_angle** (*float in [0, 180], (optional)*) – Highlight Angle, Less than 90 limits the angle used in the tonal range
- **dirt_angle** (*float in [0, 180], (optional)*) – Dirt Angle, Less than 90 limits the angle used in the tonal range
- **dirt_only** (*boolean, (optional)*) – Dirt Only, Dont calculate cleans for convex areas

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`bpy.ops.paint.vertex_color_set` ()
Undocumented ([contribute](#))

`bpy.ops.paint.vertex_paint` (*stroke=None*)
Undocumented ([contribute](#))

Parameters stroke (*bpy_prop_collection of OperatorStrokeElement, (optional)*) – Stroke

`bpy.ops.paint.vertex_paint_toggle` ()
Undocumented ([contribute](#))

`bpy.ops.paint.weight_from_bones` (*type='AUTOMATIC'*)
Undocumented ([contribute](#))

Parameters type (*enum in ['AUTOMATIC', 'ENVELOPES'], (optional)*) – Type, Method to use for assigning weights

- **AUTOMATIC** Automatic, Automatic weights froms bones.
- **ENVELOPES** From Envelopes, Weights from envelopes with user defined radius.

`bpy.ops.paint.weight_paint` (*stroke=None*)
Undocumented (contribute)

Parameters `stroke` (*bpy_prop_collection of OperatorStrokeElement, (optional)*) – Stroke

`bpy.ops.paint.weight_paint_toggle` ()
Undocumented (contribute)

`bpy.ops.paint.weight_sample` ()
Undocumented (contribute)

`bpy.ops.paint.weight_sample_group` (*group='DEFAULT'*)
Undocumented (contribute)

Parameters `group` (*enum in ['DEFAULT'], (optional)*) – Keying Set, The Keying Set to use

`bpy.ops.paint.weight_set` ()
Undocumented (contribute)

Particle Operators

`bpy.ops.particle.brush_edit` (*stroke=None*)
Undocumented (contribute)

Parameters `stroke` (*bpy_prop_collection of OperatorStrokeElement, (optional)*) – Stroke

`bpy.ops.particle.connect_hair` (*all=False*)
Connect hair to the emitter mesh

Parameters `all` (*boolean, (optional)*) – All hair, Connect all hair systems to the emitter mesh

`bpy.ops.particle.delete` (*type='PARTICLE'*)
Undocumented (contribute)

Parameters `type` (*enum in ['PARTICLE', 'KEY'], (optional)*) – Type, Delete a full particle or only keys

`bpy.ops.particle.disconnect_hair` (*all=False*)
Disconnect hair from the emitter mesh

Parameters `all` (*boolean, (optional)*) – All hair, Disconnect all hair systems from the emitter mesh

`bpy.ops.particle.dupliobj_copy` ()
Duplicate the current dupliobject

`bpy.ops.particle.dupliobj_move_down` ()
Move dupli object down in the list

`bpy.ops.particle.dupliobj_move_up` ()
Move dupli object up in the list

`bpy.ops.particle.dupliobj_remove` ()
Remove the selected dupliobject

`bpy.ops.particle.edited_clear` ()
Undocumented (contribute)

`bpy.ops.particle.hide` (*unselected=False*)
Undocumented (contribute)

Parameters `unselected` (*boolean, (optional)*) – Unselected, Hide unselected rather than selected

`bpy.ops.particle.mirror` ()
Undocumented (contribute)

`bpy.ops.particle.new` ()
Add new particle settings

`bpy.ops.particle.new_target` ()
Add a new particle target

`bpy.ops.particle.particle_edit_toggle` ()
Undocumented (contribute)

`bpy.ops.particle.rekey` (*keys=2*)
Undocumented (contribute)

Parameters `keys` (*int in [2, inf], (optional)*) – Number of Keys

`bpy.ops.particle.remove_doubles` (*threshold=0.0002*)
Undocumented (contribute)

Parameters `threshold` (*float in [0, inf], (optional)*) – Threshold, Threshold distance withing which particles are removed

`bpy.ops.particle.reveal` ()
Undocumented (contribute)

`bpy.ops.particle.select_all` (*action='TOGGLE'*)
Undocumented (contribute)

Parameters `action` (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.particle.select_inverse` ()
Undocumented (contribute)

`bpy.ops.particle.select_less` ()
Undocumented (contribute)

`bpy.ops.particle.select_linked` (*deselect=False, location=(0, 0)*)
Undocumented (contribute)

Parameters

- `deselect` (*boolean, (optional)*) – Deselect, Deselect linked keys rather than selecting them
- `location` (*int array of 2 items in [0, inf], (optional)*) – Location

`bpy.ops.particle.select_more` ()
Undocumented (contribute)

`bpy.ops.particle.select_roots` ()
Undocumented (contribute)

`bpy.ops.particle.select_tips()`
Undocumented ([contribute](#))

`bpy.ops.particle.subdivide()`
Undocumented ([contribute](#))

`bpy.ops.particle.target_move_down()`
Move particle target down in the list

`bpy.ops.particle.target_move_up()`
Move particle target up in the list

`bpy.ops.particle.target_remove()`
Remove the selected particle target

`bpy.ops.particle.weight_set` (*factor=1.0*)
Undocumented ([contribute](#))

Parameters *factor* (*float in [0, 1], (optional)*) – Factor

Pose Operators

`bpy.ops.pose.armature_apply()`
Apply the current pose as the new rest pose

`bpy.ops.pose.armature_layers` (*layers=(False, False)*)
Change the visible armature layers

Parameters *layers* (*boolean array of 32 items, (optional)*) – Layer, Armature layers to make visible

`bpy.ops.pose.autoside_names` (*axis='XAXIS'*)
Automatically renames the selected bones according to which side of the target axis they fall on

Parameters *axis* (*enum in ['XAXIS', 'YAXIS', 'ZAXIS'], (optional)*) – Axis, Axis tag names with

- XAXIS X-Axis, Left/Right.
- YAXIS Y-Axis, Front/Back.
- ZAXIS Z-Axis, Top/Bottom.

`bpy.ops.pose.bone_layers` (*layers=(False, False)*)
Change the layers that the selected bones belong to

Parameters *layers* (*boolean array of 32 items, (optional)*) – Layer, Armature layers that bone belongs to

`bpy.ops.pose.breakdown` (*prev_frame=0, next_frame=0, percentage=0.5*)
Create a suitable breakdown pose on the current frame

Parameters

- **prev_frame** (*int in [-300000, 300000], (optional)*) – Previous Keyframe, Frame number of keyframe immediately before the current frame
- **next_frame** (*int in [-300000, 300000], (optional)*) – Next Keyframe, Frame number of keyframe immediately after the current frame

- **percentage** (*float in [0, 1], (optional)*) – Percentage, Weighting factor for the sliding operation

`bpy.ops.pose.constraint_add` (*type=''*)

Add a constraint to the active bone

Parameters type (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP'], (optional)*) – Type

- CAMERA_SOLVER Camera Solver.
- FOLLOW_TRACK Follow Track.
- COPY_LOCATION Copy Location.
- COPY_ROTATION Copy Rotation.
- COPY_SCALE Copy Scale.
- COPY_TRANSFORMS Copy Transforms.
- LIMIT_DISTANCE Limit Distance.
- LIMIT_LOCATION Limit Location.
- LIMIT_ROTATION Limit Rotation.
- LIMIT_SCALE Limit Scale.
- MAINTAIN_VOLUME Maintain Volume.
- TRANSFORM Transformation.
- CLAMP_TO Clamp To.
- DAMPED_TRACK Damped Track, Tracking by taking the shortest path.
- IK Inverse Kinematics.
- LOCKED_TRACK Locked Track, Tracking along a single axis.
- SPLINE_IK Spline IK.
- STRETCH_TO Stretch To.
- TRACK_TO Track To, Legacy tracking constraint prone to twisting artifacts.
- ACTION Action.
- CHILD_OF Child Of.
- FLOOR Floor.
- FOLLOW_PATH Follow Path.
- PIVOT Pivot.
- RIGID_BODY_JOINT Rigid Body Joint.
- SCRIPT Script.
- SHRINKWRAP Shrinkwrap.

`bpy.ops.pose.constraint_add_with_targets` (*type=''*)

Add a constraint to the active bone, with target (where applicable) set to the selected Objects/Bones

Parameters type (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP']*, (optional)) – Type

- CAMERA_SOLVER Camera Solver.
- FOLLOW_TRACK Follow Track.
- COPY_LOCATION Copy Location.
- COPY_ROTATION Copy Rotation.
- COPY_SCALE Copy Scale.
- COPY_TRANSFORMS Copy Transforms.
- LIMIT_DISTANCE Limit Distance.
- LIMIT_LOCATION Limit Location.
- LIMIT_ROTATION Limit Rotation.
- LIMIT_SCALE Limit Scale.
- MAINTAIN_VOLUME Maintain Volume.
- TRANSFORM Transformation.
- CLAMP_TO Clamp To.
- DAMPED_TRACK Damped Track, Tracking by taking the shortest path.
- IK Inverse Kinematics.
- LOCKED_TRACK Locked Track, Tracking along a single axis.
- SPLINE_IK Spline IK.
- STRETCH_TO Stretch To.
- TRACK_TO Track To, Legacy tracking constraint prone to twisting artifacts.
- ACTION Action.
- CHILD_OF Child Of.
- FLOOR Floor.
- FOLLOW_PATH Follow Path.
- PIVOT Pivot.
- RIGID_BODY_JOINT Rigid Body Joint.
- SCRIPT Script.
- SHRINKWRAP Shrinkwrap.

`bpy.ops.pose.constraints_clear()`
Clear all the constraints for the selected bones

`bpy.ops.pose.constraints_copy()`
Copy constraints to other selected bones

`bpy.ops.pose.copy()`
Copies the current pose of the selected bones to copy/paste buffer

`bpy.ops.pose.flip_names()`
Flips (and corrects) the axis suffixes of the the names of selected bones

`bpy.ops.pose.group_add()`
Add a new bone group

`bpy.ops.pose.group_assign(type=0)`
Add selected bones to the chosen bone group

Parameters `type` (*int in [0, 10], (optional)*) – Bone Group Index

`bpy.ops.pose.group_deselect()`
Deselect bones of active Bone Group

`bpy.ops.pose.group_move(direction='UP')`
Change position of active Bone Group in list of Bone Groups

Parameters `direction` (*enum in ['UP', 'DOWN'], (optional)*) – Direction, Direction to move, UP or DOWN

`bpy.ops.pose.group_remove()`
Removes the active bone group

`bpy.ops.pose.group_select()`
Select bones in active Bone Group

`bpy.ops.pose.group_sort()`
Sort Bone Groups by their names in ascending order

`bpy.ops.pose.group_unassign()`
Remove selected bones from all bone groups

`bpy.ops.pose.hide(unselected=False)`
Tag selected bones to not be visible in Pose Mode

Parameters `unselected` (*boolean, (optional)*) – Unselected

`bpy.ops.pose.ik_add(with_targets=True)`
Add IK Constraint to the active Bone

Parameters `with_targets` (*boolean, (optional)*) – With Targets, Assign IK Constraint with targets derived from the select bones/objects

`bpy.ops.pose.ik_clear()`
Remove all IK Constraints from selected bones

`bpy.ops.pose.loc_clear()`
Reset locations of selected bones to their default values

`bpy.ops.pose.paste(flipped=False, selected_mask=False)`
Paste the stored pose on to the current pose

Parameters

- **flipped** (*boolean, (optional)*) – Flipped on X-Axis, Paste the stored pose flipped on to current pose
- **selected_mask** (*boolean, (optional)*) – On Selected Only, Only paste the stored pose on to selected bones in the current pose

`bpy.ops.pose.paths_calculate()`
Calculate paths for the selected bones

`bpy.ops.pose.paths_clear()`
Clear path caches for selected bones

`bpy.ops.pose.propagate` (*mode='WHILE_HELD', end_frame=250.0*)

Copy selected aspects of the current pose to subsequent poses already keyframed

Parameters

- **mode** (*enum in ['WHILE_HELD', 'NEXT_KEY', 'LAST_KEY', 'BEFORE_FRAME', 'BEFORE_END', 'SELECTED_MARKERS'], (optional)*) – Terminate Mode, Method used to determine when to stop propagating pose to keyframes
 - `WHILE_HELD` While Held, Propagate pose to all keyframes after current frame that don't change (Default behaviour).
 - `NEXT_KEY` To Next Keyframe, Propagate pose to first keyframe following the current frame only.
 - `LAST_KEY` To Last Keyframe, Propagate pose to the last keyframe only (i.e. making action cyclic).
 - `BEFORE_FRAME` Before Frame, Propagate pose to all keyframes between current frame and 'Frame' property.
 - `BEFORE_END` Before Last Keyframe, Propagate pose to all keyframes from current frame until no more are found.
 - `SELECTED_MARKERS` On Selected Markers, Propagate pose to all keyframes occurring on frames with Scene Markers after the current frame.
- **end_frame** (*float in [1.17549e-38, inf], (optional)*) – End Frame, Frame to stop propagating frames to (for 'Before Frame' mode)

`bpy.ops.pose.push` (*prev_frame=0, next_frame=0, percentage=0.5*)

Exaggerate the current pose

Parameters

- **prev_frame** (*int in [-300000, 300000], (optional)*) – Previous Keyframe, Frame number of keyframe immediately before the current frame
- **next_frame** (*int in [-300000, 300000], (optional)*) – Next Keyframe, Frame number of keyframe immediately after the current frame
- **percentage** (*float in [0, 1], (optional)*) – Percentage, Weighting factor for the sliding operation

`bpy.ops.pose.quaternions_flip` ()

Flip quaternion values to achieve desired rotations, while maintaining the same orientations

`bpy.ops.pose.relax` (*prev_frame=0, next_frame=0, percentage=0.5*)

Make the current pose more similar to its surrounding ones

Parameters

- **prev_frame** (*int in [-300000, 300000], (optional)*) – Previous Keyframe, Frame number of keyframe immediately before the current frame
- **next_frame** (*int in [-300000, 300000], (optional)*) – Next Keyframe, Frame number of keyframe immediately after the current frame
- **percentage** (*float in [0, 1], (optional)*) – Percentage, Weighting factor for the sliding operation

`bpy.ops.pose.reveal` ()

Unhide all bones that have been tagged to be hidden in Pose Mode

`bpy.ops.pose.rot_clear()`

Reset rotations of selected bones to their default values

`bpy.ops.pose.rotation_mode_set (type='QUATERNION')`

Set the rotation representation used by selected bones

Parameters `type` (*enum in ['QUATERNION', 'XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX', 'AXIS_ANGLE']*, (*optional*)) – Rotation Mode

- QUATERNION Quaternion (WXYZ), No Gimbal Lock (default).
- XYZ XYZ Euler, XYZ Rotation Order (prone to Gimbal Lock).
- XZY XZY Euler, XZY Rotation Order (prone to Gimbal Lock).
- YXZ YXZ Euler, YXZ Rotation Order (prone to Gimbal Lock).
- YZX YZX Euler, YZX Rotation Order (prone to Gimbal Lock).
- ZXY ZXY Euler, ZXY Rotation Order (prone to Gimbal Lock).
- ZYX ZYX Euler, ZYX Rotation Order (prone to Gimbal Lock).
- AXIS_ANGLE Axis Angle, Axis Angle (W+XYZ), defines a rotation around some axis defined by 3D-Vector.

`bpy.ops.pose.scale_clear()`

Reset scaling of selected bones to their default values

`bpy.ops.pose.select_all (action='TOGGLE')`

Toggle selection status of all bones

Parameters `action` (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT']*, (*optional*)) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.pose.select_constraint_target()`

Select bones used as targets for the currently selected bones

`bpy.ops.pose.select_flip_active()`

Activate the bone with a flipped name

`bpy.ops.pose.select_grouped (extend=False, type='LAYER')`

Select all visible bones grouped by similar properties

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **type** (*enum in ['LAYER', 'GROUP', 'KEYINGSET']*, (*optional*)) – Type
 - LAYER Layer, Shared layers.
 - GROUP Group, Shared group.
 - KEYINGSET Keying Set, All bones affected by active Keying Set.

`bpy.ops.pose.select_hierarchy (direction='PARENT', extend=False)`

Select immediate parent/children of selected bones

Parameters

- **direction** (*enum in ['PARENT', 'CHILD'], (optional)*) – Direction
- **extend** (*boolean, (optional)*) – Add to Selection

`bpy.ops.pose.select_inverse()`
Flip the selection status of bones (selected -> unselected, unselected -> selected)

`bpy.ops.pose.select_linked(extend=False)`
Select bones related to selected ones by parent/child relationships

Parameters `extend` (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.pose.select_parent()`
Select bones that are parents of the currently selected bones

`bpy.ops.pose.transforms_clear()`
Reset location, rotation, and scaling of selected bones to their default values

`bpy.ops.pose.user_transforms_clear()`
Reset pose on selected bones to keyframed state

`bpy.ops.pose.visual_transform_apply()`
Apply final constrained position of pose bones to their transform

Poselib Operators

`bpy.ops.poselib.action_sanitise()`
Make action suitable for use as a Pose Library

`bpy.ops.poselib.apply_pose(pose_index=-1)`
Apply specified Pose Library pose to the rig

Parameters `pose_index` (*int in [-2, inf], (optional)*) – Pose, Index of the pose to apply (-2 for no change to pose, -1 for poselib active pose)

`bpy.ops.poselib.browse_interactive(pose_index=-1)`
Interactively browse poses in 3D-View

Parameters `pose_index` (*int in [-2, inf], (optional)*) – Pose, Index of the pose to apply (-2 for no change to pose, -1 for poselib active pose)

`bpy.ops.poselib.new()`
Add New Pose Library to active Object

`bpy.ops.poselib.pose_add(frame=1, name="Pose")`
Add the current Pose to the active Pose Library

Parameters

- **frame** (*int in [0, inf], (optional)*) – Frame, Frame to store pose on
- **name** (*string, (optional)*) – Pose Name, Name of newly added Pose

`bpy.ops.poselib.pose_remove(pose='DEFAULT')`
Remove nth pose from the active Pose Library

Parameters `pose` (*enum in ['DEFAULT'], (optional)*) – Pose, The pose to remove

`bpy.ops.poselib.pose_rename(name="RenamedPose", pose='')`
Rename specified pose from the active Pose Library

Parameters

- **name** (*string, (optional)*) – New Pose Name, New name for pose
- **pose** (*enum in [], (optional)*) – Pose, The pose to rename

`bpy.ops.poselib.unlink()`
Remove Pose Library from active Object

Ptcache Operators

`bpy.ops.ptcache.add()`
Add new cache

`bpy.ops.ptcache.bake (bake=False)`
Bake physics

Parameters **bake** (*boolean, (optional)*) – Bake

`bpy.ops.ptcache.bake_all (bake=True)`
Bake all physics

Parameters **bake** (*boolean, (optional)*) – Bake

`bpy.ops.ptcache.bake_from_cache()`
Bake from cache

`bpy.ops.ptcache.free_bake()`
Free physics bake

`bpy.ops.ptcache.free_bake_all()`
Undocumented ([contribute](#))

`bpy.ops.ptcache.remove()`
Delete current cache

Render Operators

`bpy.ops.render.opengl (animation=False, write_still=False, view_context=True)`
OpenGL render active viewport

Parameters

- **animation** (*boolean, (optional)*) – Animation, Render files from the animation range of this scene
- **write_still** (*boolean, (optional)*) – Write Image, Save rendered the image to the output path (used only when animation is disabled)
- **view_context** (*boolean, (optional)*) – View Context, Use the current 3D view for rendering, else use scene settings

`bpy.ops.render.play_rendered_anim()`
Play back rendered frames/movies using an external player

File [startup/bl_operators/screen_play_rendered_anim.py:74](#)

`bpy.ops.render.preset_add (name="", remove_active=False)`
Add a Render Preset

Parameters **name** (*string, (optional)*) – Name, Name of the preset, used to make the path name

File [startup/bl_operators/presets.py:50](#)

`bpy.ops.render.render` (*animation=False, write_still=False, layer=""*, *scene=""*)
Render active scene

Parameters

- **animation** (*boolean, (optional)*) – Animation, Render files from the animation range of this scene
- **write_still** (*boolean, (optional)*) – Write Image, Save rendered the image to the output path (used only when animation is disabled)
- **layer** (*string, (optional)*) – Render Layer, Single render layer to re-render (used only when animation is disabled)
- **scene** (*string, (optional)*) – Scene, Scene to render, current scene if not specified

`bpy.ops.render.view_cancel` ()
Cancel show render view

`bpy.ops.render.view_show` ()
Toggle show render view

Scene Operators

`bpy.ops.scene.delete` ()
Delete active scene

`bpy.ops.scene.new` (*type='NEW'*)
Add new scene by type

Parameters **type** (*enum in ['NEW', 'EMPTY', 'LINK_OBJECTS', 'LINK_OBJECT_DATA', 'FULL_COPY'], (optional)*) – Type

- **NEW** New, Add new scene.
- **EMPTY** Copy Settings, Make a copy without any objects.
- **LINK_OBJECTS** Link Objects, Link to the objects from the current scene.
- **LINK_OBJECT_DATA** Link Object Data, Copy objects linked to data from the current scene.
- **FULL_COPY** Full Copy, Make a full copy of the current scene.

`bpy.ops.scene.render_layer_add` ()
Add a render layer

`bpy.ops.scene.render_layer_remove` ()
Remove the selected render layer

Screen Operators

`bpy.ops.screen.actionzone` (*modifier=0*)
Handle area action zones for mouse actions/gestures

Parameters **modifier** (*int in [0, 2], (optional)*) – Modifier, Modifier state

`bpy.ops.screen.animation_cancel` (*restore_frame=True*)
Cancel animation, returning to the original frame

Parameters **restore_frame** (*boolean, (optional)*) – Restore Frame, Restore the frame when animation was initialized

`bpy.ops.screen.animation_play` (*reverse=False, sync=False*)
Play animation

Parameters

- **reverse** (*boolean, (optional)*) – Play in Reverse, Animation is played backwards
- **sync** (*boolean, (optional)*) – Sync, Drop frames to maintain framerate

`bpy.ops.screen.animation_step` ()
Step through animation by position

`bpy.ops.screen.area_dupli` ()
Duplicate selected area into new window

`bpy.ops.screen.area_join` (*min_x=-100, min_y=-100, max_x=-100, max_y=-100*)
Join selected areas into new window

Parameters

- **min_x** (*int in [-inf, inf], (optional)*) – X 1
- **min_y** (*int in [-inf, inf], (optional)*) – Y 1
- **max_x** (*int in [-inf, inf], (optional)*) – X 2
- **max_y** (*int in [-inf, inf], (optional)*) – Y 2

`bpy.ops.screen.area_move` (*x=0, y=0, delta=0*)
Move selected area edges

Parameters

- **x** (*int in [-inf, inf], (optional)*) – X
- **y** (*int in [-inf, inf], (optional)*) – Y
- **delta** (*int in [-inf, inf], (optional)*) – Delta

`bpy.ops.screen.area_options` ()
Operations for splitting and merging

`bpy.ops.screen.area_split` (*direction='HORIZONTAL', factor=0.5, mouse_x=-100, mouse_y=-100*)
Split selected area into new windows

Parameters

- **direction** (*enum in ['HORIZONTAL', 'VERTICAL'], (optional)*) – Direction
- **factor** (*float in [0, 1], (optional)*) – Factor
- **mouse_x** (*int in [-inf, inf], (optional)*) – Mouse X
- **mouse_y** (*int in [-inf, inf], (optional)*) – Mouse Y

`bpy.ops.screen.area_swap` ()
Swap selected areas screen positions

`bpy.ops.screen.back_to_previous` ()
Revert back to the original screen layout, before fullscreen area overlay

`bpy.ops.screen.delete` ()
Delete active screen

`bpy.ops.screen.frame_jump` (*end=False*)
Jump to first/last frame in frame range

Parameters `end` (*boolean, (optional)*) – Last Frame, Jump to the last frame of the frame range

`bpy.ops.screen.frame_offset` (*delta=0*)
Undocumented ([contribute](#))

Parameters `delta` (*int in [-inf, inf], (optional)*) – Delta

`bpy.ops.screen.header_flip` ()
Undocumented ([contribute](#))

`bpy.ops.screen.header_toolbox` ()
Display header region toolbox

`bpy.ops.screen.keyframe_jump` (*next=True*)
Jump to previous/next keyframe

Parameters `next` (*boolean, (optional)*) – Next Keyframe

`bpy.ops.screen.new` ()
Add a new screen

`bpy.ops.screen.redo_last` ()
Display menu for last action performed

`bpy.ops.screen.region_flip` ()
Undocumented ([contribute](#))

`bpy.ops.screen.region_quadview` ()
Split selected area into camera, front, right & top views

`bpy.ops.screen.region_scale` ()
Scale selected area

`bpy.ops.screen.repeat_history` (*index=0*)
Display menu for previous actions performed

Parameters `index` (*int in [0, inf], (optional)*) – Index

`bpy.ops.screen.repeat_last` ()
Repeat last action

`bpy.ops.screen.screen_full_area` ()
Toggle display selected area as fullscreen

`bpy.ops.screen.screen_set` (*delta=0*)
Cycle through available screens

Parameters `delta` (*int in [-inf, inf], (optional)*) – Delta

`bpy.ops.screen.screencast` (*filepath=""*, *full=True*)
Undocumented ([contribute](#))

Parameters

- `filepath` (*string, (optional)*) – filepath
- `full` (*boolean, (optional)*) – Full Screen

`bpy.ops.screen.screenshot` (*filepath=""*, *check_existing=True*, *filter_blender=False*, *filter_image=True*, *filter_movie=False*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *full=True*)

Undocumented ([contribute](#))

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **full** (*boolean, (optional)*) – Full Screen

`bpy.ops.screen.spacedata_cleanup()`
Remove unused settings for invisible editors

`bpy.ops.screen.userpref_show()`
Show/hide user preferences

Script Operators

`bpy.ops.script.execute_preset(filepath="", menu_idname="")`
Execute a preset

Parameters

- **filepath** (*string, (optional)*) – Path, Path of the Python file to execute
- **menu_idname** (*string, (optional)*) – Menu ID Name, ID name of the menu this was called from

File `startup/bl_operators/presets.py:159`

`bpy.ops.script.python_file_run(filepath="")`
Run Python file

Parameters **filepath** (*string, (optional)*) – Path

`bpy.ops.script.reload()`
Reload Scripts

Sculpt Operators

`bpy.ops.sculpt.brush_stroke(stroke=None, mode='NORMAL', ignore_background_click=False)`
Undocumented ([contribute](#))

Parameters

- **stroke** (*bpy_prop_collection* of *OperatorStrokeElement*, (*optional*)) – Stroke
- **mode** (*enum* in [*'NORMAL'*, *'INVERT'*, *'SMOOTH'*], (*optional*)) – Sculpt Stroke Mode, Action taken when a sculpt stroke is made
 - *NORMAL* Normal, Apply brush normally.
 - *INVERT* Invert, Invert action of brush for duration of stroke.
 - *SMOOTH* Smooth, Switch brush to smooth mode for duration of stroke.
- **ignore_background_click** (*boolean*, (*optional*)) – Ignore Background Click, Clicks on the background do not start the stroke

`bpy.ops.sculpt.sculptmode_toggle()`
Undocumented ([contribute](#))

`bpy.ops.sculpt.set_persistent_base()`
Undocumented ([contribute](#))

Sequencer Operators

`bpy.ops.sequencer.change_effect_input` (*swap*='A_B')
Undocumented ([contribute](#))

Parameters *swap* (*enum* in [*'A_B'*, *'B_C'*, *'A_C'*], (*optional*)) – Swap, The effect inputs to swap

`bpy.ops.sequencer.change_effect_type` (*type*='CROSS')
Undocumented ([contribute](#))

Parameters *type* (*enum* in [*'CROSS'*, *'ADD'*, *'SUBTRACT'*, *'ALPHA_OVER'*, *'ALPHA_UNDER'*, *'GAMMA_CROSS'*, *'MULTIPLY'*, *'OVER_DROP'*, *'PLUGIN'*, *'WIPE'*, *'GLOW'*, *'TRANSFORM'*, *'COLOR'*, *'SPEED'*, *'MULTICAM'*, *'ADJUSTMENT'*], (*optional*)) – Type, Sequencer effect type

- *CROSS* Crossfade, Crossfade effect strip type.
- *ADD* Add, Add effect strip type.
- *SUBTRACT* Subtract, Subtract effect strip type.
- *ALPHA_OVER* Alpha Over, Alpha Over effect strip type.
- *ALPHA_UNDER* Alpha Under, Alpha Under effect strip type.
- *GAMMA_CROSS* Gamma Cross, Gamma Cross effect strip type.
- *MULTIPLY* Multiply, Multiply effect strip type.
- *OVER_DROP* Alpha Over Drop, Alpha Over Drop effect strip type.
- *PLUGIN* Plugin, Plugin effect strip type.
- *WIPE* Wipe, Wipe effect strip type.
- *GLOW* Glow, Glow effect strip type.
- *TRANSFORM* Transform, Transform effect strip type.
- *COLOR* Color, Color effect strip type.
- *SPEED* Speed, Color effect strip type.
- *MULTICAM* Multicam Selector.

- ADJUSTMENT Adjustment Layer.

`bpy.ops.sequencer.change_path` (*filepath=""*, *directory=""*, *files=None*, *filter_blender=False*, *filter_image=True*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *relative_path=True*)

Undocumented ([contribute](#))

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **directory** (*string, (optional)*) – Directory, Directory of the file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – Files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file

`bpy.ops.sequencer.copy` ()

Undocumented ([contribute](#))

`bpy.ops.sequencer.crossfade_sounds` ()

Do crossfading volume animation of two selected sound strips

File `startup/bl_operators/sequencer.py:41`

`bpy.ops.sequencer.cut` (*frame=0*, *type='SOFT'*, *side='BOTH'*)

Cut the selected strips

Parameters

- **frame** (*int in [-inf, inf], (optional)*) – Frame, Frame where selected strips will be cut
- **type** (*enum in ['SOFT', 'HARD'], (optional)*) – Type, The type of cut operation to perform on strips
- **side** (*enum in ['LEFT', 'RIGHT', 'BOTH'], (optional)*) – Side, The side that remains selected after cutting

`bpy.ops.sequencer.cut_multicam` (*camera=1*)

Cut multicam strip and select camera

Parameters **camera** (*int in [1, 32], (optional)*) – Camera

File `startup/bl_operators/sequencer.py:99`

`bpy.ops.sequencer.deinterlace_selected_movies()`
Deinterlace all selected movie sources

File `startup/bl_operators/sequencer.py:134`

`bpy.ops.sequencer.delete()`
Erase selected strips from the sequencer

`bpy.ops.sequencer.duplicate(mode='TRANSLATION')`
Duplicate the selected strips

Parameters `mode` (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE']*, (optional)) – Mode

`bpy.ops.sequencer.effect_strip_add(filepath="", filter_blender=False, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=False, filemode=9, relative_path=True, frame_start=0, frame_end=0, channel=1, replace_sel=True, overlap=False, type='CROSS', color=(0.0, 0.0, 0.0))`

Add an effect to the sequencer, most are applied on top of existing strips

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Start frame of the sequence strip
- **frame_end** (*int in [-inf, inf], (optional)*) – End Frame, End frame for the color strip
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection

- **overlap** (*boolean, (optional)*) – Allow Overlap, Don't correct overlap on new sequence strips
- **type** (*enum in ['CROSS', 'ADD', 'SUBTRACT', 'ALPHA_OVER', 'ALPHA_UNDER', 'GAMMA_CROSS', 'MULTIPLY', 'OVER_DROP', 'PLUGIN', 'WIPE', 'GLOW', 'TRANSFORM', 'COLOR', 'SPEED', 'MULTICAM', 'ADJUSTMENT'], (optional)*) – Type, Sequencer effect type
 - CROSS Crossfade, Crossfade effect strip type.
 - ADD Add, Add effect strip type.
 - SUBTRACT Subtract, Subtract effect strip type.
 - ALPHA_OVER Alpha Over, Alpha Over effect strip type.
 - ALPHA_UNDER Alpha Under, Alpha Under effect strip type.
 - GAMMA_CROSS Gamma Cross, Gamma Cross effect strip type.
 - MULTIPLY Multiply, Multiply effect strip type.
 - OVER_DROP Alpha Over Drop, Alpha Over Drop effect strip type.
 - PLUGIN Plugin, Plugin effect strip type.
 - WIPE Wipe, Wipe effect strip type.
 - GLOW Glow, Glow effect strip type.
 - TRANSFORM Transform, Transform effect strip type.
 - COLOR Color, Color effect strip type.
 - SPEED Speed, Color effect strip type.
 - MULTICAM Multicam Selector.
 - ADJUSTMENT Adjustment Layer.
- **color** (*float array of 3 items in [0, 1], (optional)*) – Color, Initialize the strip with this color (only used when type='COLOR')

```
bpy.ops.sequencer.image_strip_add(directory="", files=None, filter_blender=False, filter_image=True, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, relative_path=True, frame_start=0, frame_end=0, channel=1, replace_sel=True, overlap=False)
```

Add an image or image sequence to the sequencer

Parameters

- **directory** (*string, (optional)*) – Directory, Directory of the file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – Files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files

- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Start frame of the sequence strip
- **frame_end** (*int in [-inf, inf], (optional)*) – End Frame, End frame for the color strip
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **overlap** (*boolean, (optional)*) – Allow Overlap, Don't correct overlap on new sequence strips

`bpy.ops.sequencer.images_separate` (*length=1*)

On image sequence strips, it returns a strip for each image

Parameters **length** (*int in [1, 1000], (optional)*) – Length, Length of each frame

`bpy.ops.sequencer.lock` ()

Lock the active strip so that it can't be transformed

`bpy.ops.sequencer.meta_make` ()

Group selected strips into a metastrip

`bpy.ops.sequencer.meta_separate` ()

Put the contents of a metastrip back in the sequencer

`bpy.ops.sequencer.meta_toggle` ()

Toggle a metastrip (to edit enclosed strips)

`bpy.ops.sequencer.movie_strip_add` (*filepath=""*, *files=None*, *filter_blender=False*, *filter_image=False*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *relative_path=True*, *frame_start=0*, *channel=1*, *replace_sel=True*, *overlap=False*, *sound=True*)

Add a movie strip to the sequencer

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – Files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files

- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Start frame of the sequence strip
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **overlap** (*boolean, (optional)*) – Allow Overlap, Don't correct overlap on new sequence strips
- **sound** (*boolean, (optional)*) – Sound, Load sound with the movie

`bpy.ops.sequencer.mute` (*unselected=False*)
Mute selected strips

Parameters `unselected` (*boolean, (optional)*) – Unselected, Mute unselected rather than selected strips

`bpy.ops.sequencer.next_edit` ()
Move frame to next edit point

`bpy.ops.sequencer.offset_clear` ()
Clear strip offsets from the start and end frames

`bpy.ops.sequencer.paste` ()
Undocumented ([contribute](#))

`bpy.ops.sequencer.previous_edit` ()
Move frame to previous edit point

`bpy.ops.sequencer.properties` ()
Open sequencer properties panel

`bpy.ops.sequencer.reassign_inputs` ()
Reassign the inputs for the effect strip

`bpy.ops.sequencer.rebuild_proxy` ()
Rebuild all selected proxies and timecode indices using the job system

`bpy.ops.sequencer.refresh_all` ()
Refresh the sequencer editor

`bpy.ops.sequencer.reload` ()
Reload strips in the sequencer

`bpy.ops.sequencer.render_size` ()
Set render size and aspect from active sequence

`bpy.ops.sequencer.scene_strip_add` (*frame_start=0, channel=1, replace_sel=True, overlap=False, scene=''*)
Add a strip to the sequencer using a blender scene as a source

Parameters

- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Start frame of the sequence strip
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into

- **replace_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **overlap** (*boolean, (optional)*) – Allow Overlap, Don't correct overlap on new sequence strips
- **scene** (*enum in [], (optional)*) – Scene

`bpy.ops.sequencer.select` (*extend=False, linked_handle=False, left_right=False, linked_time=False*)
Select a strip (last selected becomes the “active strip”)

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend the selection
- **linked_handle** (*boolean, (optional)*) – Linked Handle, Select handles next to the active strip
- **left_right** (*boolean, (optional)*) – Left/Right, Select based on the current frame side the cursor is on
- **linked_time** (*boolean, (optional)*) – Linked Time, Select other strips at the same time

`bpy.ops.sequencer.select_active_side` (*side='BOTH'*)
Select strips on the nominated side of the active strip

Parameters *side* (*enum in ['LEFT', 'RIGHT', 'BOTH'], (optional)*) – Side, The side of the handle that is selected

`bpy.ops.sequencer.select_all_toggle` ()
Select or deselect all strips

`bpy.ops.sequencer.select_border` (*gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True*)
Enable border select mode

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.sequencer.select_grouped` (*extend=False, type='TYPE'*)
Select all strips grouped by various properties

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **type** (*enum in ['TYPE', 'TYPE_BASIC', 'TYPE_EFFECT', 'DATA', 'EFFECT', 'EFFECT_LINK', 'OVERLAP'], (optional)*) – Type
 - `TYPE` Type, Shared strip type.
 - `TYPE_BASIC` Global Type, All strips of same basic type (Graphical or Sound).
 - `TYPE_EFFECT` Effect Type, Shared strip effect type (if active strip is not an effect one, select all non-effect strips).

- DATA Data, Shared data (scene, image, sound, etc.).
- EFFECT Effect, Shared effects.
- EFFECT_LINK Effect/Linked, Other strips affected by the active one (sharing some time, and below or effect-assigned).
- OVERLAP Overlap, Overlapping time.

`bpy.ops.sequencer.select_handles` (*side='BOTH'*)
Select manipulator handles on the sides of the selected strip

Parameters *side* (*enum in ['LEFT', 'RIGHT', 'BOTH'], (optional)*) – Side, The side of the handle that is selected

`bpy.ops.sequencer.select_inverse` ()
Select unselected strips

`bpy.ops.sequencer.select_less` ()
Shrink the current selection of adjacent selected strips

`bpy.ops.sequencer.select_linked` ()
Select all strips adjacent to the current selection

`bpy.ops.sequencer.select_linked_pick` (*extend=False*)
Select a chain of linked strips nearest to the mouse pointer

Parameters *extend* (*boolean, (optional)*) – Extend, extend the selection

`bpy.ops.sequencer.select_more` ()
Select more strips adjacent to the current selection

`bpy.ops.sequencer.snap` (*frame=0*)
Frame where selected strips will be snapped

Parameters *frame* (*int in [-inf, inf], (optional)*) – Frame, Frame where selected strips will be snapped

`bpy.ops.sequencer.sound_strip_add` (*filepath=""*, *files=None*, *filter_blender=False*, *filter_image=False*, *filter_movie=False*, *filter_python=False*, *filter_font=False*, *filter_sound=True*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *relative_path=True*, *frame_start=0*, *channel=1*, *replace_sel=True*, *overlap=False*, *cache=False*)

Add a sound strip to the sequencer

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – Files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files

- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **frame_start** (*int in [-inf, inf], (optional)*) – Start Frame, Start frame of the sequence strip
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **overlap** (*boolean, (optional)*) – Allow Overlap, Don't correct overlap on new sequence strips
- **cache** (*boolean, (optional)*) – Cache, Cache the sound in memory

`bpy.ops.sequencer.swap` (*side='RIGHT'*)
Swap active strip with strip to the right or left

Parameters *side* (*enum in ['LEFT', 'RIGHT'], (optional)*) – Side, Side of the strip to swap

`bpy.ops.sequencer.swap_data` ()
Swap 2 sequencer strips

`bpy.ops.sequencer.swap_inputs` ()
Swap the first two inputs for the effect strip

`bpy.ops.sequencer.unlock` ()
Unlock the active strip so that it can't be transformed

`bpy.ops.sequencer.unmute` (*unselected=False*)
Un-Mute unselected rather than selected strips

Parameters *unselected* (*boolean, (optional)*) – Unselected, UnMute unselected rather than selected strips

`bpy.ops.sequencer.view_all` ()
View all the strips in the sequencer

`bpy.ops.sequencer.view_all_preview` ()
Zoom preview to fit in the area

`bpy.ops.sequencer.view_ghost_border` (*gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0*)
Enable border select mode

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.sequencer.view_selected` ()
Zoom the sequencer on the selected strips

`bpy.ops.sequencer.view_toggle` ()
Toggle between sequencer views (sequence, preview, both)

`bpy.ops.sequencer.view_zoom_ratio` (*ratio=1.0*)

Change zoom ratio of sequencer preview

Parameters `ratio` (*float in [0, inf], (optional)*) – Ratio, Zoom ratio, 1.0 is 1:1, higher is zoomed in, lower is zoomed out

Sketch Operators

`bpy.ops.sketch.cancel_stroke` ()

Undocumented (contribute)

`bpy.ops.sketch.convert` ()

Undocumented (contribute)

`bpy.ops.sketch.delete` ()

Undocumented (contribute)

`bpy.ops.sketch.draw_preview` (*snap=False*)

Undocumented (contribute)

Parameters `snap` (*boolean, (optional)*) – Snap

`bpy.ops.sketch.draw_stroke` (*snap=False*)

Undocumented (contribute)

Parameters `snap` (*boolean, (optional)*) – Snap

`bpy.ops.sketch.finish_stroke` ()

Undocumented (contribute)

`bpy.ops.sketch.gesture` (*snap=False*)

Undocumented (contribute)

Parameters `snap` (*boolean, (optional)*) – Snap

`bpy.ops.sketch.select` ()

Undocumented (contribute)

Sound Operators

`bpy.ops.sound.bake_animation` ()

Updates the audio animation cache so that it's up to date

`bpy.ops.sound.mixdown` (*filepath=""*, *check_existing=True*, *filter_blender=False*, *filter_image=False*, *filter_movie=False*, *filter_python=False*, *filter_font=False*, *filter_sound=True*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *accuracy=1024*, *container='FLAC'*, *codec='FLAC'*, *format='S16'*, *bitrate=192*)

Mixes the scene's audio to a sound file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files

- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **accuracy** (*int in [1, inf], (optional)*) – Accuracy, Sample accuracy, important for animation data (the lower the value, the more accurate)
- **container** (*enum in ['FLAC', 'OGG', 'WAV'], (optional)*) – Container, File format
 - FLAC flac, Free Lossless Audio Codec.
 - OGG ogg, Xiph.Org Ogg Container.
 - WAV wav, Waveform Audio File Format.
- **codec** (*enum in ['FLAC', 'PCM', 'VORBIS'], (optional)*) – Codec, Audio Codec
 - FLAC FLAC, Free Lossless Audio Codec.
 - PCM PCM, Pulse Code Modulation (RAW).
 - VORBIS Vorbis, Xiph.Org Vorbis Codec.
- **format** (*enum in ['U8', 'S16', 'S24', 'S32', 'F32', 'F64'], (optional)*) – Format, Sample format
 - U8 U8, 8 bit unsigned.
 - S16 S16, 16 bit signed.
 - S24 S24, 24 bit signed.
 - S32 S32, 32 bit signed.
 - F32 F32, 32 bit floating point.
 - F64 F64, 64 bit floating point.
- **bitrate** (*int in [32, 512], (optional)*) – Bitrate, Bitrate in kbit/s

```
bpy.ops.sound.open(filepath="", filter_blender=False, filter_image=False, filter_movie=True,
                  filter_python=False, filter_font=False, filter_sound=True, filter_text=False,
                  filter_btx=False, filter_collada=False, filter_folder=True, filemode=9, rela-
                  tive_path=True, cache=False, mono=False)
```

Load a sound file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files

- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **cache** (*boolean, (optional)*) – Cache, Cache the sound in memory
- **mono** (*boolean, (optional)*) – Mono, Mixdown the sound to mono

```
bpy.ops.sound.open_mono(filepath="", filter_blender=False, filter_image=False, filter_movie=True,
                        filter_python=False, filter_font=False, filter_sound=True, filter_text=False,
                        filter_btx=False, filter_collada=False, filter_folder=True, filemode=9,
                        relative_path=True, cache=False, mono=True)
```

Load a sound file as mono

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **cache** (*boolean, (optional)*) – Cache, Cache the sound in memory
- **mono** (*boolean, (optional)*) – Mono, Mixdown the sound to mono

```
bpy.ops.sound.pack()
```

Pack the sound into the current blend file

```
bpy.ops.sound.unpack(method='USE_LOCAL', id="")
```

Unpack the sound to the samples filename

Parameters

- **method** (*enum in ['USE_LOCAL', 'WRITE_LOCAL', 'USE_ORIGINAL', 'WRITE_ORIGINAL'], (optional)*) – Method, How to unpack
- **id** (*string, (optional)*) – Sound Name, Sound datablock name to unpack

`bpy.ops.sound.update_animation_flags()`
Update animation flags

Surface Operators

`bpy.ops.surface.primitive_nurbs_surface_circle_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Nurbs surface Circle

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

`bpy.ops.surface.primitive_nurbs_surface_curve_add` (*view_align=False, enter_editmode=False, location=(0.0, 0.0, 0.0), rotation=(0.0, 0.0, 0.0), layers=(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)*)

Construct a Nurbs surface Curve

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.surface.primitive_nurbs_surface_cylinder_add (view_align=False,          enter_
                                                    editmode=False,      loca-
                                                    tion=(0.0,  0.0,  0.0),  rota-
                                                    tion=(0.0,  0.0,  0.0),  lay-
                                                    ers=(False, False, False, False,
                                                    False, False, False, False,
                                                    False, False, False, False,
                                                    False, False, False, False,
                                                    False, False, False, False))
```

Construct a Nurbs surface Cylinder

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.surface.primitive_nurbs_surface_sphere_add (view_align=False,          enter_
                                                    editmode=False,      loca-
                                                    tion=(0.0, 0.0, 0.0), rotation=(0.0,
                                                    0.0, 0.0), layers=(False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False))
```

Construct a Nurbs surface Sphere

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.surface.primitive_nurbs_surface_surface_add (view_align=False,          enter_
                                                    editmode=False,      loca-
                                                    tion=(0.0,  0.0,  0.0),  rota-
                                                    tion=(0.0,  0.0,  0.0),  lay-
                                                    ers=(False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False))
```

Construct a Nurbs surface Patch

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
bpy.ops.surface.primitive_nurbs_surface_torus_add (view_align=False,
                                                    enter_editmode=False, location=(0.0,
                                                    0.0, 0.0), rotation=(0.0, 0.0, 0.0),
                                                    layers=(False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False, False, False, False, False,
                                                    False))
```

Construct a Nurbs surface Torus

Parameters

- **view_align** (*boolean, (optional)*) – Align to View, Align the new object to the view
- **enter_editmode** (*boolean, (optional)*) – Enter Editmode, Enter editmode when adding this object
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location, Location for the newly added object
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation, Rotation for the newly added object
- **layers** (*boolean array of 20 items, (optional)*) – Layer

Text Operators

```
bpy.ops.text.comment ()
    Convert selected text to comment
```

```
bpy.ops.text.convert_whitespace (type='SPACES')
    Convert whitespaces by type
```

Parameters **type** (*enum in ['SPACES', 'TABS'], (optional)*) – Type, Type of whitespace to convert to

```
bpy.ops.text.copy ()
    Copy selected text to clipboard
```

```
bpy.ops.text.cursor_set (x=0, y=0)
    Set cursor position
```

Parameters

- **x** (*int in [-inf, inf], (optional)*) – X
- **y** (*int in [-inf, inf], (optional)*) – Y

`bpy.ops.text.cut()`
Cut selected text to clipboard

`bpy.ops.text.delete (type='NEXT_CHARACTER')`
Delete text by cursor position

Parameters `type` (*enum in ['NEXT_CHARACTER', 'PREVIOUS_CHARACTER', 'NEXT_WORD', 'PREVIOUS_WORD'], (optional)*) – Type, Which part of the text to delete

`bpy.ops.text.find()`
Find specified text

`bpy.ops.text.find_set_selected()`
Find specified text and set as selected

`bpy.ops.text.indent()`
Indent selected text

`bpy.ops.text.insert (text="")`
Insert text at cursor position

Parameters `text` (*string, (optional)*) – Text, Text to insert at the cursor position

`bpy.ops.text.jump (line=1)`
Jump cursor to line

Parameters `line` (*int in [1, inf], (optional)*) – Line, Line number to jump to

`bpy.ops.text.line_break()`
Insert line break at cursor position

`bpy.ops.text.line_number()`
The current line number

`bpy.ops.text.make_internal()`
Make active text file internal

`bpy.ops.text.mark_all()`
Mark all specified text

`bpy.ops.text.markers_clear()`
Clear all markers

`bpy.ops.text.move (type='LINE_BEGIN')`
Move cursor to position type

Parameters `type` (*enum in ['LINE_BEGIN', 'LINE_END', 'FILE_TOP', 'FILE_BOTTOM', 'PREVIOUS_CHARACTER', 'NEXT_CHARACTER', 'PREVIOUS_WORD', 'NEXT_WORD', 'PREVIOUS_LINE', 'NEXT_LINE', 'PREVIOUS_PAGE', 'NEXT_PAGE'], (optional)*) – Type, Where to move cursor to

`bpy.ops.text.move_select (type='LINE_BEGIN')`
Make selection from current cursor position to new cursor position type

Parameters `type` (*enum in ['LINE_BEGIN', 'LINE_END', 'FILE_TOP', 'FILE_BOTTOM', 'PREVIOUS_CHARACTER', 'NEXT_CHARACTER', 'PREVIOUS_WORD', 'NEXT_WORD', 'PREVIOUS_LINE', 'NEXT_LINE', 'PREVIOUS_PAGE', 'NEXT_PAGE'], (optional)*) – Type, Where to move cursor to, to make a selection

`bpy.ops.text.new()`
Create a new text data block

`bpy.ops.text.next_marker()`
Move to next marker

`bpy.ops.text.open` (*filepath=""*, *filter_blender=False*, *filter_image=False*, *filter_movie=False*, *filter_python=True*, *filter_font=False*, *filter_sound=False*, *filter_text=True*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*, *internal=False*)

Open a new text data block

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **internal** (*boolean, (optional)*) – Make internal, Make text file internal after loading

`bpy.ops.text.override_toggle` ()
Toggle overwrite while typing

`bpy.ops.text.paste` (*selection=False*)
Paste text from clipboard

Parameters *selection* (*boolean, (optional)*) – Selection, Paste text selected elsewhere rather than copied (X11 only)

`bpy.ops.text.previous_marker` ()
Move to previous marker

`bpy.ops.text.properties` ()
Toggle text properties panel

`bpy.ops.text.refresh_pyconstraints` ()
Refresh all pyconstraints

`bpy.ops.text.reload` ()
Reload active text data block from its file

`bpy.ops.text.replace` ()
Replace text with the specified text

`bpy.ops.text.replace_set_selected` ()
Replace text with specified text and set as selected

`bpy.ops.text.resolve_conflict` (*resolution='IGNORE'*)
When external text is out of sync, resolve the conflict

Parameters *resolution* (*enum in ['IGNORE', 'RELOAD', 'SAVE', 'MAKE_INTERNAL'], (optional)*) – Resolution, How to solve conflict due to differences in internal and external text

`bpy.ops.text.run_script()`
Run active script

`bpy.ops.text.save()`
Save active text data block

`bpy.ops.text.save_as(filepath="", check_existing=True, filter_blender=False, filter_image=False, filter_movie=False, filter_python=True, filter_font=False, filter_sound=False, filter_text=True, filter_btx=False, filter_collada=False, filter_folder=True, filemode=9)`
Save active text file with options

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

`bpy.ops.text.scroll(lines=1)`
Scroll text screen

Parameters **lines** (*int in [-inf, inf], (optional)*) – Lines, Number of lines to scroll

`bpy.ops.text.scroll_bar(lines=1)`
Scroll text screen

Parameters **lines** (*int in [-inf, inf], (optional)*) – Lines, Number of lines to scroll

`bpy.ops.text.select_all()`
Select all text

`bpy.ops.text.select_line()`
Select text by line

`bpy.ops.text.select_word()`
Select word under cursor

`bpy.ops.text.selection_set(select=False)`
Set cursor selection

Parameters **select** (*boolean, (optional)*) – Select, Set selection end rather than cursor

`bpy.ops.text.to_3d_object` (*split_lines=False*)
Create 3d text object from active text data block

Parameters `split_lines` (*boolean, (optional)*) – Split Lines, Create one object per line in the text

`bpy.ops.text.uncomment` ()
Convert selected comment to text

`bpy.ops.text.unindent` ()
Unindent selected text

`bpy.ops.text.unlink` ()
Unlink active text data block

Texture Operators

`bpy.ops.texture.envmap_clear` ()
Discard the environment map and free it from memory

`bpy.ops.texture.envmap_clear_all` ()
Discard all environment maps in the .blend file and free them from memory

`bpy.ops.texture.envmap_save` (*layout=(0.0, 0.0, 1.0, 0.0, 2.0, 0.0, 0.0, 1.0, 1.0, 1.0, 2.0, 1.0), filepath=""*, *check_existing=True*, *filter_blender=False*, *filter_image=True*, *filter_movie=True*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=9*)
Save the current generated Environment map to an image file

Parameters

- **layout** (*float array of 12 items in [-inf, inf], (optional)*) – File layout, Flat array describing the X,Y position of each cube face in the output image, where 1 is the size of a face - order is [+Z -Z +Y -X -Y +X] (use -1 to skip a face)
- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

`bpy.ops.texture.new()`
Add a new texture

`bpy.ops.texture.slot_copy()`
Copy the material texture settings and nodes

`bpy.ops.texture.slot_move(type='UP')`
Move texture slots up and down

Parameters `type` (*enum in ['UP', 'DOWN'], (optional)*) – Type

`bpy.ops.texture.slot_paste()`
Copy the texture settings and nodes

Time Operators

`bpy.ops.time.end_frame_set()`
Set the end frame

`bpy.ops.time.start_frame_set()`
Set the start frame

`bpy.ops.time.view_all()`
Show the entire playable frame range

Transform Operators

`bpy.ops.transform.create_orientation(name="", use=False, overwrite=False)`
Create transformation orientation from selection

Parameters

- **name** (*string, (optional)*) – Name, Text to insert at the cursor position
- **use** (*boolean, (optional)*) – Use after creation, Select orientation after its creation
- **overwrite** (*boolean, (optional)*) – Overwrite previous, Overwrite previously created orientation with same name

`bpy.ops.transform.delete_orientation()`
Delete transformation orientation

`bpy.ops.transform.edge_crease(value=0.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)`

Change the crease of edges

Parameters

- **value** (*float in [-1, 1], (optional)*) – Factor
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.

- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.edge_slide` (*value=0.0, mirror=False, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), correct_uv=False, release_confirm=False*)

Slide an edge loop along a mesh

Parameters

- **value** (*float in [-1, 1], (optional)*) – Factor
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **correct_uv** (*boolean, (optional)*) – Correct UV coords when transforming
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.mirror` (*constraint_axis=(False, False, False), constraint_orientation='', proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, release_confirm=False*)

Mirror selected vertices around one or more axes

Parameters

- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - DISABLED Disable, Proportional Editing disabled.
 - ENABLED Enable, Proportional Editing enabled.
 - CONNECTED Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode

- SMOOTH Smooth, Smooth falloff.
- SPHERE Sphere, Spherical falloff.
- ROOT Root, Root falloff.
- SHARP Sharp, Sharp falloff.
- LINEAR Linear, Linear falloff.
- CONSTANT Constant, Constant falloff.
- RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.push_pull (value=0.0, mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)
```

Push/Pull selected items

Parameters

- **value** (*float in [-inf, inf], (optional)*) – Distance
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - DISABLED Disable, Proportional Editing disabled.
 - ENABLED Enable, Proportional Editing enabled.
 - CONNECTED Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - SMOOTH Smooth, Smooth falloff.
 - SPHERE Sphere, Spherical falloff.
 - ROOT Root, Root falloff.
 - SHARP Sharp, Sharp falloff.
 - LINEAR Linear, Linear falloff.
 - CONSTANT Constant, Constant falloff.
 - RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.

- **MEDIAN** Median, Snap median onto target.
- **ACTIVE** Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.resize` (*value=(1.0, 1.0, 1.0), constraint_axis=(False, False, False), constraint_orientation='', mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), texture_space=False, release_confirm=False*)

Resize selected items

Parameters

- **value** (*float array of 3 items in [-inf, inf], (optional)*) – Vector
- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - **DISABLED** Disable, Proportional Editing disabled.
 - **ENABLED** Enable, Proportional Editing enabled.
 - **CONNECTED** Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - **SMOOTH** Smooth, Smooth falloff.
 - **SPHERE** Sphere, Spherical falloff.
 - **ROOT** Root, Root falloff.
 - **SHARP** Sharp, Sharp falloff.
 - **LINEAR** Linear, Linear falloff.
 - **CONSTANT** Constant, Constant falloff.
 - **RANDOM** Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - **CLOSEST** Closest, Snap closest point onto target.
 - **CENTER** Center, Snap center onto target.

- **MEDIAN** Median, Snap median onto target.
- **ACTIVE** Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **texture_space** (*boolean, (optional)*) – Edit Object data texture space
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.rotate(value=(0.0), axis=(0.0, 0.0, 0.0), constraint_axis=(False, False, False),
constraint_orientation='', mirror=False, proportional='DISABLED',
proportional_edit_falloff='SMOOTH', proportional_size=1.0,
snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0),
snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)
```

Rotate selected items

Parameters

- **value** (*float array of 1 items in [-inf, inf], (optional)*) – Angle
- **axis** (*float array of 3 items in [-inf, inf], (optional)*) – Axis, The axis around which the transformation occurs
- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - **DISABLED** Disable, Proportional Editing disabled.
 - **ENABLED** Enable, Proportional Editing enabled.
 - **CONNECTED** Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - **SMOOTH** Smooth, Smooth falloff.
 - **SPHERE** Sphere, Spherical falloff.
 - **ROOT** Root, Root falloff.
 - **SHARP** Sharp, Sharp falloff.
 - **LINEAR** Linear, Linear falloff.
 - **CONSTANT** Constant, Constant falloff.
 - **RANDOM** Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target

- CLOSEST Closest, Snap closest point onto target.
- CENTER Center, Snap center onto target.
- MEDIAN Median, Snap median onto target.
- ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.select_orientation` (*orientation=''*)
Select transformation orientation

Parameters orientation (*enum in [], (optional)*) – Orientation, Transformation orientation

`bpy.ops.transform.seq_slide` (*value=(1.0, 1.0), snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False*)

Slide a sequence strip in time

Parameters

- **value** (*float array of 2 items in [-inf, inf], (optional)*) – Angle
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.shear` (*value=0.0, mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False*)

Shear selected items along the horizontal screen axis

Parameters

- **value** (*float in [-inf, inf], (optional)*) – Offset
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing

- `DISABLED` Disable, Proportional Editing disabled.
- `ENABLED` Enable, Proportional Editing enabled.
- `CONNECTED` Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - `SMOOTH` Smooth, Smooth falloff.
 - `SPHERE` Sphere, Spherical falloff.
 - `ROOT` Root, Root falloff.
 - `SHARP` Sharp, Sharp falloff.
 - `LINEAR` Linear, Linear falloff.
 - `CONSTANT` Constant, Constant falloff.
 - `RANDOM` Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - `CLOSEST` Closest, Snap closest point onto target.
 - `CENTER` Center, Snap center onto target.
 - `MEDIAN` Median, Snap median onto target.
 - `ACTIVE` Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.shrink_fatten (value=0.0, mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)
```

Shrink/fatten selected vertices along normals

Parameters

- **value** (*float in [-inf, inf], (optional)*) – Offset
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - `DISABLED` Disable, Proportional Editing disabled.
 - `ENABLED` Enable, Proportional Editing enabled.
 - `CONNECTED` Connected, Proportional Editing using connected geometry only.

- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - SMOOTH Smooth, Smooth falloff.
 - SPHERE Sphere, Spherical falloff.
 - ROOT Root, Root falloff.
 - SHARP Sharp, Sharp falloff.
 - LINEAR Linear, Linear falloff.
 - CONSTANT Constant, Constant falloff.
 - RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.transform.snap_type` (*type='INCREMENT'*)

Set the snap element type

Parameters **type** (*enum in ['INCREMENT', 'VERTEX', 'EDGE', 'FACE', 'VOLUME'], (optional)*)

– Type, Set the snap element type

- INCREMENT Increment, Snap to increments of grid.
- VERTEX Vertex, Snap to vertices.
- EDGE Edge, Snap to edges.
- FACE Face, Snap to faces.
- VOLUME Volume, Snap to volume.

`bpy.ops.transform.tilt` (*value=(0.0), constraint_axis=(False, False, False), constraint_orientation=',', mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False*)

Tilt selected control vertices of 3d curve

Parameters

- **value** (*float array of 1 items in [-inf, inf], (optional)*) – Angle

- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - DISABLED Disable, Proportional Editing disabled.
 - ENABLED Enable, Proportional Editing enabled.
 - CONNECTED Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - SMOOTH Smooth, Smooth falloff.
 - SPHERE Sphere, Spherical falloff.
 - ROOT Root, Root falloff.
 - SHARP Sharp, Sharp falloff.
 - LINEAR Linear, Linear falloff.
 - CONSTANT Constant, Constant falloff.
 - RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.tosphere (value=0.0, mirror=False, proportional='DISABLED',
                             proportional_edit_falloff='SMOOTH', proportional_size=1.0,
                             snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0,
                             0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0),
                             release_confirm=False)
```

Move selected vertices outward in a spherical shape around mesh center

Parameters

- **value** (*float in [0, 1], (optional)*) – Factor
- **mirror** (*boolean, (optional)*) – Mirror Editing

- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - `DISABLED` Disable, Proportional Editing disabled.
 - `ENABLED` Enable, Proportional Editing enabled.
 - `CONNECTED` Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - `SMOOTH` Smooth, Smooth falloff.
 - `SPHERE` Sphere, Spherical falloff.
 - `ROOT` Root, Root falloff.
 - `SHARP` Sharp, Sharp falloff.
 - `LINEAR` Linear, Linear falloff.
 - `CONSTANT` Constant, Constant falloff.
 - `RANDOM` Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - `CLOSEST` Closest, Snap closest point onto target.
 - `CENTER` Center, Snap center onto target.
 - `MEDIAN` Median, Snap median onto target.
 - `ACTIVE` Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.trackball (value=(1.0, 1.0), mirror=False, proportional='DISABLED',
                             proportional_edit_falloff='SMOOTH', proportional_size=1.0,
                             snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0,
                             0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), re-
                             lease_confirm=False)
```

Trackball style rotation of selected items

Parameters

- **value** (*float array of 2 items in [-inf, inf], (optional)*) – angle
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - `DISABLED` Disable, Proportional Editing disabled.

- ENABLED Enable, Proportional Editing enabled.
- CONNECTED Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - SMOOTH Smooth, Smooth falloff.
 - SPHERE Sphere, Spherical falloff.
 - ROOT Root, Root falloff.
 - SHARP Sharp, Sharp falloff.
 - LINEAR Linear, Linear falloff.
 - CONSTANT Constant, Constant falloff.
 - RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.transform(mode='TRANSLATION', value=(0.0, 0.0, 0.0, 0.0), axis=(0.0, 0.0, 0.0), constraint_axis=(False, False, False), constraint_orientation='', mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)
```

Transform selected items by mode type

Parameters

- **mode** (*enum in ['INIT', 'DUMMY', 'TRANSLATION', 'ROTATION', 'RESIZE', 'TOSPHERE', 'SHEAR', 'WARP', 'SHRINKFATTEN', 'TILT', 'TRACKBALL', 'PUSHPULL', 'CREASE', 'MIRROR', 'BONE_SIZE', 'BONE_ENVELOPE', 'CURVE_SHRINKFATTEN', 'BONE_ROLL', 'TIME_TRANSLATE', 'TIME_SLIDE', 'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE'], (optional)*) – Mode
- **value** (*float array of 4 items in [-inf, inf], (optional)*) – Values

- **axis** (*float array of 3 items in [-inf, inf], (optional)*) – Axis, The axis around which the transformation occurs
- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - `DISABLED` Disable, Proportional Editing disabled.
 - `ENABLED` Enable, Proportional Editing enabled.
 - `CONNECTED` Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - `SMOOTH` Smooth, Smooth falloff.
 - `SPHERE` Sphere, Spherical falloff.
 - `ROOT` Root, Root falloff.
 - `SHARP` Sharp, Sharp falloff.
 - `LINEAR` Linear, Linear falloff.
 - `CONSTANT` Constant, Constant falloff.
 - `RANDOM` Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - `CLOSEST` Closest, Snap closest point onto target.
 - `CENTER` Center, Snap center onto target.
 - `MEDIAN` Median, Snap median onto target.
 - `ACTIVE` Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.translate (value=(0.0, 0.0, 0.0), constraint_axis=(False, False, False), constraint_orientation='', mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), texture_space=False, release_confirm=False)
```

Translate selected items

Parameters

- **value** (*float array of 3 items in [-inf, inf], (optional)*) – Vector
- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - `DISABLED` Disable, Proportional Editing disabled.
 - `ENABLED` Enable, Proportional Editing enabled.
 - `CONNECTED` Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - `SMOOTH` Smooth, Smooth falloff.
 - `SPHERE` Sphere, Spherical falloff.
 - `ROOT` Root, Root falloff.
 - `SHARP` Sharp, Sharp falloff.
 - `LINEAR` Linear, Linear falloff.
 - `CONSTANT` Constant, Constant falloff.
 - `RANDOM` Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - `CLOSEST` Closest, Snap closest point onto target.
 - `CENTER` Center, Snap center onto target.
 - `MEDIAN` Median, Snap median onto target.
 - `ACTIVE` Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **texture_space** (*boolean, (optional)*) – Edit Object data texture space
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

```
bpy.ops.transform.warp (value=(0.0), mirror=False, proportional='DISABLED', proportional_edit_falloff='SMOOTH', proportional_size=1.0, snap=False, snap_target='CLOSEST', snap_point=(0.0, 0.0, 0.0), snap_align=False, snap_normal=(0.0, 0.0, 0.0), release_confirm=False)
```

Warp selected items around the cursor

Parameters

- **value** (*float array of 1 items in [-inf, inf], (optional)*) – Angle
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional)*) – Proportional Editing
 - DISABLED Disable, Proportional Editing disabled.
 - ENABLED Enable, Proportional Editing enabled.
 - CONNECTED Connected, Proportional Editing using connected geometry only.
- **proportional_edit_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode
 - SMOOTH Smooth, Smooth falloff.
 - SPHERE Sphere, Spherical falloff.
 - ROOT Root, Root falloff.
 - SHARP Sharp, Sharp falloff.
 - LINEAR Linear, Linear falloff.
 - CONSTANT Constant, Constant falloff.
 - RANDOM Random, Random falloff.
- **proportional_size** (*float in [1e-05, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – Target
 - CLOSEST Closest, Snap closest point onto target.
 - CENTER Center, Snap center onto target.
 - MEDIAN Median, Snap median onto target.
 - ACTIVE Active, Snap active onto target.
- **snap_point** (*float array of 3 items in [-inf, inf], (optional)*) – Point
- **snap_align** (*boolean, (optional)*) – Align with Point Normal
- **snap_normal** (*float array of 3 items in [-inf, inf], (optional)*) – Normal
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

Ui Operators

`bpy.ops.ui.copy_data_path_button()`
Copy the RNA data path for this property to the clipboard

`bpy.ops.ui.copy_to_selected_button(all=True)`
Copy property from this object to selected objects or bones

Parameters `all` (*boolean, (optional)*) – All, Reset to default values all elements of the array

`bpy.ops.ui.editsource()`
Edit source code for a button

`bpy.ops.ui.eyedropper()`
Sample a color from the Blender Window to store in a property

`bpy.ops.ui.reports_to_textblock()`
Write the reports

`bpy.ops.ui.reset_default_button(all=True)`
Reset this property's value to its default value

Parameters `all` (*boolean, (optional)*) – All, Reset to default values all elements of the array

`bpy.ops.ui.reset_default_theme()`
Reset to the default theme colors

Uv Operators

`bpy.ops.uv.align(axis='ALIGN_AUTO')`
Align selected UV vertices to an axis

Parameters `axis` (*enum in ['ALIGN_S', 'ALIGN_T', 'ALIGN_U', 'ALIGN_AUTO', 'ALIGN_X', 'ALIGN_Y'], (optional)*) – Axis, Axis to align UV locations on

- `ALIGN_S` Straighten, Align UVs along the line defined by the endpoints.
- `ALIGN_T` Straighten X, Align UVs along the line defined by the endpoints along the X axis.
- `ALIGN_U` Straighten Y, Align UVs along the line defined by the endpoints along the Y axis.
- `ALIGN_AUTO` Align Auto, Automatically choose the axis on which there is most alignment already.
- `ALIGN_X` Align X, Align UVs on X axis.
- `ALIGN_Y` Align Y, Align UVs on Y axis.

`bpy.ops.uv.average_islands_scale()`
Undocumented ([contribute](#))

`bpy.ops.uv.circle_select(x=0, y=0, radius=0, gesture_mode=0)`
Select UV vertices using circle selection

Parameters

- `x` (*int in [-inf, inf], (optional)*) – X
- `y` (*int in [-inf, inf], (optional)*) – Y
- `radius` (*int in [-inf, inf], (optional)*) – Radius
- `gesture_mode` (*int in [-inf, inf], (optional)*) – Gesture Mode

`bpy.ops.uv.cube_project(cube_size=1.0, correct_aspect=True, clip_to_bounds=False, scale_to_bounds=False)`
Undocumented ([contribute](#))

Parameters

- `cube_size` (*float in [0, inf], (optional)*) – Cube Size, Size of the cube to project on
- `correct_aspect` (*boolean, (optional)*) – Correct Aspect, Map UVs taking image aspect ratio into account

- **clip_to_bounds** (*boolean, (optional)*) – Clip to Bounds, Clip UV coordinates to bounds after unwrapping
- **scale_to_bounds** (*boolean, (optional)*) – Scale to Bounds, Scale UV coordinates to bounds after unwrapping

`bpy.ops.uv.cursor_set` (*location=(0.0, 0.0)*)

Set 2D cursor location

Parameters **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Cursor location in normalised (0.0-1.0) coordinates

`bpy.ops.uv.cylinder_project` (*direction='VIEW_ON_EQUATOR', align='POLAR_ZX', radius=1.0, correct_aspect=True, clip_to_bounds=False, scale_to_bounds=False*)

Undocumented ([contribute](#))

Parameters

- **direction** (*enum in ['VIEW_ON_EQUATOR', 'VIEW_ON_POLES', 'ALIGN_TO_OBJECT'], (optional)*) – Direction, Direction of the sphere or cylinder
 - VIEW_ON_EQUATOR View on Equator, 3D view is on the equator.
 - VIEW_ON_POLES View on Poles, 3D view is on the poles.
 - ALIGN_TO_OBJECT Align to Object, Align according to object transform.
- **align** (*enum in ['POLAR_ZX', 'POLAR_ZY'], (optional)*) – Align, How to determine rotation around the pole
 - POLAR_ZX Polar ZX, Polar 0 is X.
 - POLAR_ZY Polar ZY, Polar 0 is Y.
- **radius** (*float in [0, inf], (optional)*) – Radius, Radius of the sphere or cylinder
- **correct_aspect** (*boolean, (optional)*) – Correct Aspect, Map UVs taking image aspect ratio into account
- **clip_to_bounds** (*boolean, (optional)*) – Clip to Bounds, Clip UV coordinates to bounds after unwrapping
- **scale_to_bounds** (*boolean, (optional)*) – Scale to Bounds, Scale UV coordinates to bounds after unwrapping

`bpy.ops.uv.export_layout` (*filepath="" , check_existing=True, export_all=False, mode='PNG', size=(1024, 1024), opacity=0.25*)

Export UV layout to file

Parameters

- **filepath** (*string, (optional)*) – File Path, File path used for exporting the SVG file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **export_all** (*boolean, (optional)*) – All UVs, Export all UVs in this mesh (not just visible ones)
- **mode** (*enum in ['SVG', 'EPS', 'PNG'], (optional)*) – Format, File format to export the UV layout to
 - SVG Scalable Vector Graphic (.svg), Export the UV layout to a vector SVG file.
 - EPS Encapsulate PostScript (.eps), Export the UV layout to a vector EPS file.

- PNG PNG Image (.png), Export the UV layout to a bitmap image.
- **size** (*int array of 2 items in [8, 32768], (optional)*) – Dimensions of the exported file
- **opacity** (*float in [0, 1], (optional)*) – Fill Opacity

File `addons/io_mesh_uv_layout/__init__.py:167`

`bpy.ops.uv.follow_active_quads` (*mode='LENGTH'*)
Follow UVs from active quads along continuous face loops

Parameters **mode** (*enum in ['EVEN', 'LENGTH'], (optional)*) – Edge Length Mode, Method to space UV edge loops

- **EVEN** Even, Space all UVs evenly.
- **LENGTH** Length, Average space UVs edge length of each loop.

File `startup/bl_operators/uvcalc_follow_active.py:249`

`bpy.ops.uv.hide` (*unselected=False*)
Hide (un)selected UV vertices

Parameters **unselected** (*boolean, (optional)*) – Unselected, Hide unselected rather than selected

`bpy.ops.uv.lightmap_pack` (*PREF_CONTEXT='SEL_FACES', PREF_PACK_IN_ONE=True, PREF_NEW_UVLAYER=False, PREF_APPLY_IMAGE=False, PREF_IMG_PX_SIZE=512, PREF_BOX_DIV=12, PREF_MARGIN_DIV=0.1*)
Follow UVs from active quads along continuous face loops

Parameters

- **PREF_CONTEXT** (*enum in ['SEL_FACES', 'ALL_FACES', 'ALL_OBJECTS'], (optional)*) – Selection
 - **SEL_FACES** Selected Faces, Space all UVs evenly.
 - **ALL_FACES** All Faces, Average space UVs edge length of each loop.
 - **ALL_OBJECTS** Selected Mesh Object, Average space UVs edge length of each loop.
- **PREF_PACK_IN_ONE** (*boolean, (optional)*) – Share Tex Space, Objects Share texture space, map all objects into 1 uvmap
- **PREF_NEW_UVLAYER** (*boolean, (optional)*) – New UV Layer, Create a new UV layer for every mesh packed
- **PREF_APPLY_IMAGE** (*boolean, (optional)*) – New Image, Assign new images for every mesh (only one if shared tex space enabled)
- **PREF_IMG_PX_SIZE** (*int in [64, 5000], (optional)*) – Image Size, Width and Height for the new image
- **PREF_BOX_DIV** (*int in [1, 48], (optional)*) – Pack Quality, Pre Packing before the complex boxpack
- **PREF_MARGIN_DIV** (*float in [0.001, 1], (optional)*) – Margin, Size of the margin as a division of the UV

File `startup/bl_operators/uvcalc_lightmap.py:599`

`bpy.ops.uv.minimize_stretch` (*fill_holes=True, blend=0.0, iterations=0*)
Reduce UV stretching by relaxing angles

Parameters

- **fill_holes** (*boolean, (optional)*) – Fill Holes, Virtual fill holes in mesh before unwrapping, to better avoid overlaps and preserve symmetry
- **blend** (*float in [0, 1], (optional)*) – Blend, Blend factor between stretch minimized and original
- **iterations** (*int in [0, inf], (optional)*) – Iterations, Number of iterations to run, 0 is unlimited when run interactively

`bpy.ops.uv.pack_islands` (*margin=0.0*)

Undocumented ([contribute](#))

Parameters **margin** (*float in [0, 1], (optional)*) – Margin, Space between islands

`bpy.ops.uv.pin` (*clear=False*)

Set/clear selected UV vertices as anchored between multiple unwrap operations

Parameters **clear** (*boolean, (optional)*) – Clear, Clear pinning for the selection instead of setting it

`bpy.ops.uv.project_from_view` (*orthographic=False, correct_aspect=True, clip_to_bounds=False, scale_to_bounds=False*)

Undocumented ([contribute](#))

Parameters

- **orthographic** (*boolean, (optional)*) – Orthographic, Use orthographic projection
- **correct_aspect** (*boolean, (optional)*) – Correct Aspect, Map UVs taking image aspect ratio into account
- **clip_to_bounds** (*boolean, (optional)*) – Clip to Bounds, Clip UV coordinates to bounds after unwrapping
- **scale_to_bounds** (*boolean, (optional)*) – Scale to Bounds, Scale UV coordinates to bounds after unwrapping

`bpy.ops.uv.reset` ()

Undocumented ([contribute](#))

`bpy.ops.uv.reveal` ()

Reveal all hidden UV vertices

`bpy.ops.uv.select` (*extend=False, location=(0.0, 0.0)*)

Select UV vertices

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection
- **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Mouse location in normalized coordinates, 0.0 to 1.0 is within the image bounds

`bpy.ops.uv.select_all` (*action='TOGGLE'*)

Change selection of all UV vertices

Parameters **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional)*) – Action, Selection action to execute

- TOGGLE Toggle, Toggle selection for all elements.
- SELECT Select, Select all elements.
- DESELECT Deselect, Deselect all elements.
- INVERT Invert, Invert selection of all elements.

`bpy.ops.uv.select_border` (*pinned=False, gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True*)
Select UV vertices using border selection

Parameters

- **pinned** (*boolean, (optional)*) – Pinned, Border select pinned UVs only
- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.uv.select_linked` (*extend=False*)
Select all UV vertices linked to the active UV map

Parameters **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection

`bpy.ops.uv.select_linked_pick` (*extend=False, location=(0.0, 0.0)*)
Select all UV vertices linked under the mouse

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection
- **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Mouse location in normalized coordinates, 0.0 to 1.0 is within the image bounds

`bpy.ops.uv.select_loop` (*extend=False, location=(0.0, 0.0)*)
Select a loop of connected UV vertices

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection rather than clearing the existing selection
- **location** (*float array of 2 items in [-inf, inf], (optional)*) – Location, Mouse location in normalized coordinates, 0.0 to 1.0 is within the image bounds

`bpy.ops.uv.select_pinned` ()
Select all pinned UV vertices

`bpy.ops.uv.smart_project` (*angle_limit=66.0, island_margin=0.0, user_area_weight=0.0*)
This script projection unwraps the selected faces of a mesh (it operates on all selected mesh objects, and can be used to unwrap selected faces, or all faces)

Parameters

- **angle_limit** (*float in [1, 89], (optional)*) – Angle Limit, lower for more projection groups, higher for less distortion
- **island_margin** (*float in [0, 1], (optional)*) – Island Margin, Margin to reduce bleed from adjacent islands
- **user_area_weight** (*float in [0, 1], (optional)*) – Area Weight, Weight projections vector by faces with larger areas

File startup/bl_operators/uvcalc_smart_project.py:1141

`bpy.ops.uv.snap_cursor` (*target='PIXELS'*)

Snap cursor to target type

Parameters **target** (*enum in ['PIXELS', 'SELECTED'], (optional)*) – Target, Target to snap the selected UVs to

`bpy.ops.uv.snap_selected` (*target='PIXELS'*)

Snap selected UV vertices to target type

Parameters **target** (*enum in ['PIXELS', 'CURSOR', 'ADJACENT_UNSELECTED'], (optional)*) – Target, Target to snap the selected UVs to

`bpy.ops.uv.sphere_project` (*direction='VIEW_ON_EQUATOR', align='POLAR_ZX', correct_aspect=True, clip_to_bounds=False, scale_to_bounds=False*)

Undocumented ([contribute](#))

Parameters

- **direction** (*enum in ['VIEW_ON_EQUATOR', 'VIEW_ON_POLES', 'ALIGN_TO_OBJECT'], (optional)*) – Direction, Direction of the sphere or cylinder
 - VIEW_ON_EQUATOR View on Equator, 3D view is on the equator.
 - VIEW_ON_POLES View on Poles, 3D view is on the poles.
 - ALIGN_TO_OBJECT Align to Object, Align according to object transform.
- **align** (*enum in ['POLAR_ZX', 'POLAR_ZY'], (optional)*) – Align, How to determine rotation around the pole
 - POLAR_ZX Polar ZX, Polar 0 is X.
 - POLAR_ZY Polar ZY, Polar 0 is Y.
- **correct_aspect** (*boolean, (optional)*) – Correct Aspect, Map UVs taking image aspect ratio into account
- **clip_to_bounds** (*boolean, (optional)*) – Clip to Bounds, Clip UV coordinates to bounds after unwrapping
- **scale_to_bounds** (*boolean, (optional)*) – Scale to Bounds, Scale UV coordinates to bounds after unwrapping

`bpy.ops.uv.stitch` (*use_limit=True, limit=0.01*)

Stitch selected UV vertices by proximity

Parameters

- **use_limit** (*boolean, (optional)*) – Use Limit, Stitch UVs within a specified limit distance
- **limit** (*float in [0, inf], (optional)*) – Limit, Limit distance in normalized coordinates

`bpy.ops.uv.tile_set` (*tile=(0, 0)*)

Set UV image tile coordinates

Parameters **tile** (*int array of 2 items in [0, inf], (optional)*) – Tile, Tile coordinate

`bpy.ops.uv.unlink_selected` ()

Unlink selected UV vertices from active UV map

`bpy.ops.uv.unwrap` (*method='ANGLE_BASED', fill_holes=True, correct_aspect=True*)

Unwrap the mesh of the object being edited

Parameters

- **method** (*enum in ['ANGLE_BASED', 'CONFORMAL'], (optional)*) – Method, Unwrapping method (Angle Based usually gives better results than Conformal, while being somewhat slower)
- **fill_holes** (*boolean, (optional)*) – Fill Holes, Virtual fill holes in mesh before unwrapping, to better avoid overlaps and preserve symmetry
- **correct_aspect** (*boolean, (optional)*) – Correct Aspect, Map UVs taking image aspect ratio into account

`bpy.ops.uv.weld()`
Weld selected UV vertices together

View2D Operators

`bpy.ops.view2d.pan (deltax=0, deltay=0)`
Pan the view

Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y

`bpy.ops.view2d.reset ()`
Reset the view

`bpy.ops.view2d.scroll_down (deltax=0, deltay=0, page=False)`
Scroll the view down

Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y
- **page** (*boolean, (optional)*) – Page, Scroll down one page

`bpy.ops.view2d.scroll_left (deltax=0, deltay=0)`
Scroll the view left

Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y

`bpy.ops.view2d.scroll_right (deltax=0, deltay=0)`
Scroll the view right

Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y

`bpy.ops.view2d.scroll_up (deltax=0, deltay=0, page=False)`
Scroll the view up

Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y
- **page** (*boolean, (optional)*) – Page, Scroll up one page

`bpy.ops.view2d.scroller_activate()`
 Scroll view by mouse click and drag

`bpy.ops.view2d.zoom(deltax=0.0, deltax=0.0)`
 Zoom in/out the view

Parameters

- **deltax** (*float in [-inf, inf], (optional)*) – Delta X
- **deltay** (*float in [-inf, inf], (optional)*) – Delta Y

`bpy.ops.view2d.zoom_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0)`
 Zoom in the view to the nearest item contained in the border

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode
- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.view2d.zoom_in(zoomfacx=0.0, zoomfacy=0.0)`
 Zoom in the view

Parameters

- **zoomfacx** (*float in [-inf, inf], (optional)*) – Zoom Factor X
- **zoomfacy** (*float in [-inf, inf], (optional)*) – Zoom Factor Y

`bpy.ops.view2d.zoom_out(zoomfacx=0.0, zoomfacy=0.0)`
 Zoom out the view

Parameters

- **zoomfacx** (*float in [-inf, inf], (optional)*) – Zoom Factor X
- **zoomfacy** (*float in [-inf, inf], (optional)*) – Zoom Factor Y

View3D Operators

`bpy.ops.view3d.background_image_add(name="Image", filepath="Path")`
 Add a new background image

Parameters

- **name** (*string, (optional)*) – Name, Image name to assign
- **filepath** (*string, (optional)*) – Filepath, Path to image file

`bpy.ops.view3d.background_image_remove(index=0)`
 Remove a background image from the 3D view

Parameters **index** (*int in [0, inf], (optional)*) – Index, Background image index to remove

`bpy.ops.view3d.camera_to_view()`
 Set camera view to active view

`bpy.ops.view3d.camera_to_view_selected()`
 Move the camera so selected objects are framed

`bpy.ops.view3d.clip_border` (*xmin=0, xmax=0, ymin=0, ymax=0*)
Set the view clipping border

Parameters

- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.view3d.cursor3d` ()
Set the location of the 3D cursor

`bpy.ops.view3d.dolly` (*delta=0, mx=0, my=0*)
Dolly in/out in the view

Parameters

- **delta** (*int in [-inf, inf], (optional)*) – Delta
- **mx** (*int in [0, inf], (optional)*) – Zoom Position X
- **my** (*int in [0, inf], (optional)*) – Zoom Position Y

`bpy.ops.view3d.edit_mesh_extrude_individual_move` ()
Extrude individual elements and move

File `startup/bl_operators/view3d.py:30`

`bpy.ops.view3d.edit_mesh_extrude_move_normal` ()
Extrude and move along normals

File `startup/bl_operators/view3d.py:63`

`bpy.ops.view3d.enable_manipulator` (*translate=False, rotate=False, scale=False*)
Enable the transform manipulator for use

Parameters

- **translate** (*boolean, (optional)*) – Translate, Enable the translate manipulator
- **rotate** (*boolean, (optional)*) – Rotate, Enable the rotate manipulator
- **scale** (*boolean, (optional)*) – Scale, Enable the scale manipulator

`bpy.ops.view3d.fly` ()
Interactively fly around the scene

`bpy.ops.view3d.game_start` ()
Start game engine

`bpy.ops.view3d.layers` (*nr=1, extend=False, toggle=True*)
Toggle layer(s) visibility

Parameters

- **nr** (*int in [0, 20], (optional)*) – Number, The layer number to set, zero for all layers
- **extend** (*boolean, (optional)*) – Extend, Add this layer to the current view layers
- **toggle** (*boolean, (optional)*) – Toggle, Toggle the layer

`bpy.ops.view3d.localview` ()
Toggle display of selected object(s) separately and centered in view

`bpy.ops.view3d.manipulator` (*constraint_axis=(False, False, False)*, *constraint_orientation=''*, *release_confirm=False*)

Manipulate selected item by axis

Parameters

- **constraint_axis** (*boolean array of 3 items, (optional)*) – Constraint Axis
- **constraint_orientation** (*enum in [], (optional)*) – Orientation, Transformation orientation
- **release_confirm** (*boolean, (optional)*) – Confirm on Release, Always confirm operation when releasing button

`bpy.ops.view3d.move` ()

Move the view

`bpy.ops.view3d.ndof_orbit` ()

Explore every angle of an object using the 3D mouse

`bpy.ops.view3d.ndof_pan` ()

Position your viewpoint with the 3D mouse

`bpy.ops.view3d.object_as_camera` ()

Set the active object as the active camera for this view or scene

`bpy.ops.view3d.properties` ()

Toggles the properties panel display

`bpy.ops.view3d.render_border` (*xmin=0, xmax=0, ymin=0, ymax=0*)

Set the boundaries of the border render and enables border render

Parameters

- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.view3d.rotate` ()

Rotate the view

`bpy.ops.view3d.select` (*extend=False, center=False, enumerate=False, object=False*)

Activate/select item(s)

Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first
- **center** (*boolean, (optional)*) – Center, Use the object center when selecting, in editmode used to extend object selection
- **enumerate** (*boolean, (optional)*) – Enumerate, List objects under the mouse (object mode only)
- **object** (*boolean, (optional)*) – Object, Use object selection (editmode only)

`bpy.ops.view3d.select_border` (*gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, extend=True*)

Select items using border selection

Parameters

- **gesture_mode** (*int in [-inf, inf], (optional)*) – Gesture Mode

- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.view3d.select_circle` (*x=0, y=0, radius=0, gesture_mode=0*)
Select items using circle selection

Parameters

- **x** (*int in [-inf, inf], (optional)*) – X
- **y** (*int in [-inf, inf], (optional)*) – Y
- **radius** (*int in [-inf, inf], (optional)*) – Radius
- **gesture_mode** (*int in [-inf, inf], (optional)*) – Event Type

`bpy.ops.view3d.select_lasso` (*path=None, deselect=False, extend=True*)
Select items using lasso selection

Parameters

- **path** (*bpy_prop_collection of OperatorMousePath, (optional)*) – Path
- **deselect** (*boolean, (optional)*) – Deselect, Deselect rather than select items
- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first

`bpy.ops.view3d.smoothview` ()
The time to animate the change of view (in milliseconds)

`bpy.ops.view3d.snap_cursor_to_active` ()
Snap cursor to active item

`bpy.ops.view3d.snap_cursor_to_center` ()
Snap cursor to the Center

`bpy.ops.view3d.snap_cursor_to_grid` ()
Snap cursor to nearest grid node

`bpy.ops.view3d.snap_cursor_to_selected` ()
Snap cursor to center of selected item(s)

`bpy.ops.view3d.snap_selected_to_cursor` ()
Snap selected item(s) to cursor

`bpy.ops.view3d.snap_selected_to_grid` ()
Snap selected item(s) to nearest grid node

`bpy.ops.view3d.toolshelf` ()
Toggles tool shelf display

`bpy.ops.view3d.view_all` (*center=False*)
View all objects in scene

Parameters **center** (*boolean, (optional)*) – Center

`bpy.ops.view3d.view_center_camera` ()
Center the camera view

`bpy.ops.view3d.view_center_cursor()`
Center the view so that the cursor is in the middle of the view

`bpy.ops.view3d.view_orbit (type='ORBITLEFT')`
Orbit the view

Parameters `type` (*enum in ['ORBITLEFT', 'ORBITRIGHT', 'ORBITUP', 'ORBITDOWN'], (optional)*) – Orbit, Direction of View Orbit

- ORBITLEFT Orbit Left, Orbit the view around to the Left.
- ORBITRIGHT Orbit Right, Orbit the view around to the Right.
- ORBITUP Orbit Up, Orbit the view Up.
- ORBITDOWN Orbit Down, Orbit the view Down.

`bpy.ops.view3d.view_pan (type='PANLEFT')`
Pan the view

Parameters `type` (*enum in ['PANLEFT', 'PANRIGHT', 'PANUP', 'PANDOWN'], (optional)*) – Pan, Direction of View Pan

- PANLEFT Pan Left, Pan the view to the Left.
- PANRIGHT Pan Right, Pan the view to the Right.
- PANUP Pan Up, Pan the view Up.
- PANDOWN Pan Down, Pan the view Down.

`bpy.ops.view3d.view_persportho()`
Switch the current view from perspective/orthographic

`bpy.ops.view3d.view_selected()`
Move the view to the selection center

`bpy.ops.view3d.viewnumpad (type='FRONT', align_active=False)`
Set the view

Parameters

- `type` (*enum in ['FRONT', 'BACK', 'LEFT', 'RIGHT', 'TOP', 'BOTTOM', 'CAMERA'], (optional)*) – View, The Type of view
 - FRONT Front, View From the Front.
 - BACK Back, View From the Back.
 - LEFT Left, View From the Left.
 - RIGHT Right, View From the Right.
 - TOP Top, View From the Top.
 - BOTTOM Bottom, View From the Bottom.
 - CAMERA Camera, View From the active camera.
- `align_active` (*boolean, (optional)*) – Align Active, Align to the active object's axis

`bpy.ops.view3d.zoom (delta=0, mx=0, my=0)`
Zoom in/out in the view

Parameters

- `delta` (*int in [-inf, inf], (optional)*) – Delta

- **mx** (*int in [0, inf], (optional)*) – Zoom Position X
- **my** (*int in [0, inf], (optional)*) – Zoom Position Y

`bpy.ops.view3d.zoom_border` (*xmin=0, xmax=0, ymin=0, ymax=0*)
Zoom in the view to the nearest object contained in the border

Parameters

- **xmin** (*int in [-inf, inf], (optional)*) – X Min
- **xmax** (*int in [-inf, inf], (optional)*) – X Max
- **ymin** (*int in [-inf, inf], (optional)*) – Y Min
- **ymax** (*int in [-inf, inf], (optional)*) – Y Max

`bpy.ops.view3d.zoom_camera_1_to_1` ()
Match the camera to 1:1 to the render output

Wm Operators

`bpy.ops.wm.addon_disable` (*module=""*)
Disable an addon

Parameters **module** (*string, (optional)*) – Module, Module name of the addon to disable

File `startup/bl_operators/wm.py:1492`

`bpy.ops.wm.addon_enable` (*module=""*)
Enable an addon

Parameters **module** (*string, (optional)*) – Module, Module name of the addon to enable

File `startup/bl_operators/wm.py:1461`

`bpy.ops.wm.addon_expand` (*module=""*)
Display more information on this addon

Parameters **module** (*string, (optional)*) – Module, Module name of the addon to expand

File `startup/bl_operators/wm.py:1734`

`bpy.ops.wm.addon_install` (*overwrite=True, target='DEFAULT', filepath="", filter_folder=True, filter_python=True, filter_glob="*.py;*.zip"*)

Install an addon

Parameters

- **overwrite** (*boolean, (optional)*) – Overwrite, Remove existing addons with the same ID
- **target** (*enum in ['DEFAULT', 'PREFS'], (optional)*) – Target Path
- **filepath** (*string, (optional)*) – File Path, File path to write file to
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filter_python** (*boolean, (optional)*) – Filter python

File `startup/bl_operators/wm.py:1548`

`bpy.ops.wm.addon_remove` (*module=""*)
Disable an addon

Parameters **module** (*string, (optional)*) – Module, Module name of the addon to remove

File `startup/bl_operators/wm.py:1692`

`bpy.ops.wm.appconfig_activate` (*filepath=""*)
Undocumented (contribute)

Parameters `filepath` (*string, (optional)*) – File Path

File `startup/bl_operators/wm.py:1123`

`bpy.ops.wm.appconfig_default` ()
Undocumented (contribute)

File `startup/bl_operators/wm.py:1101`

`bpy.ops.wm.call_menu` (*name=""*)
Undocumented (contribute)

Parameters `name` (*string, (optional)*) – Name, Name of the menu

`bpy.ops.wm.context_collection_boolean_set` (*data_path_iter=""*, *data_path_item=""*,
type='TOGGLE')

Set boolean values for a collection of items

Parameters

- **data_path_iter** (*string, (optional)*) – The data path relative to the context, must point to an iterable
- **data_path_item** (*string, (optional)*) – The data path from each iterable to the value (int or float)
- **type** (*enum in ['TOGGLE', 'ENABLE', 'DISABLE'], (optional)*) – Type

File `startup/bl_operators/wm.py:593`

`bpy.ops.wm.context_cycle_array` (*data_path=""*, *reverse=False*)

Set a context array value. Useful for cycling the active mesh edit mode

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **reverse** (*boolean, (optional)*) – Reverse, Cycle backwards

File `startup/bl_operators/wm.py:469`

`bpy.ops.wm.context_cycle_enum` (*data_path=""*, *reverse=False*)
Toggle a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **reverse** (*boolean, (optional)*) – Reverse, Cycle backwards

File `startup/bl_operators/wm.py:416`

`bpy.ops.wm.context_cycle_int` (*data_path=""*, *reverse=False*)
Set a context value. Useful for cycling active material,

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **reverse** (*boolean, (optional)*) – Reverse, Cycle backwards

File `startup/bl_operators/wm.py:382`

`bpy.ops.wm.context_menu_enum` (*data_path=""*)
Undocumented (contribute)

Parameters `data_path` (*string, (optional)*) – Context Attributes, rna context string

File `startup/bl_operators/wm.py:513`

`bpy.ops.wm.context_modal_mouse` (*data_path_iter=""*, *data_path_item=""*, *input_scale=0.01*, *invert=False*, *initial_x=0*)

Adjust arbitrary values with mouse input

Parameters

- **data_path_iter** (*string, (optional)*) – The data path relative to the context, must point to an iterable
- **data_path_item** (*string, (optional)*) – The data path from each iterable to the value (int or float)
- **input_scale** (*float in [-inf, inf], (optional)*) – Scale the mouse movement by this value before applying the delta
- **invert** (*boolean, (optional)*) – Invert the mouse input

File `startup/bl_operators/wm.py:714`

`bpy.ops.wm.context_scale_int` (*data_path=""*, *value=1.0*, *always_step=True*)
Scale an int context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*float in [-inf, inf], (optional)*) – Value, Assign value
- **always_step** (*boolean, (optional)*) – Always Step, Always adjust the value by a minimum of 1 when ‘value’ is not 1.0

File `startup/bl_operators/wm.py:225`

`bpy.ops.wm.context_set_boolean` (*data_path=""*, *value=True*)
Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*boolean, (optional)*) – Value, Assignment value

File `startup/bl_operators/wm.py:127`

`bpy.ops.wm.context_set_enum` (*data_path=""*, *value=""*)
Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*string, (optional)*) – Value, Assignment value (as a string)

File `startup/bl_operators/wm.py:127`

`bpy.ops.wm.context_set_float` (*data_path=""*, *value=0.0*, *relative=False*)
Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string

- **value** (*float in [-inf, inf], (optional)*) – Value, Assignment value
- **relative** (*boolean, (optional)*) – Relative, Apply relative to the current value (delta)

File `startup/bl_operators/wm.py:127`

`bpy.ops.wm.context_set_id` (*data_path=""*, *value=""*)

Toggle a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*string, (optional)*) – Value, Assign value

File `startup/bl_operators/wm.py:533`

`bpy.ops.wm.context_set_int` (*data_path=""*, *value=0*, *relative=False*)

Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*int in [-inf, inf], (optional)*) – Value, Assign value
- **relative** (*boolean, (optional)*) – Relative, Apply relative to the current value (delta)

File `startup/bl_operators/wm.py:127`

`bpy.ops.wm.context_set_string` (*data_path=""*, *value=""*)

Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*string, (optional)*) – Value, Assign value

File `startup/bl_operators/wm.py:127`

`bpy.ops.wm.context_set_value` (*data_path=""*, *value=""*)

Set a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value** (*string, (optional)*) – Value, Assignment value (as a string)

File `startup/bl_operators/wm.py:312`

`bpy.ops.wm.context_toggle` (*data_path=""*)

Toggle a context value

Parameters **data_path** (*string, (optional)*) – Context Attributes, rna context string

File `startup/bl_operators/wm.py:328`

`bpy.ops.wm.context_toggle_enum` (*data_path=""*, *value_1=""*, *value_2=""*)

Toggle a context value

Parameters

- **data_path** (*string, (optional)*) – Context Attributes, rna context string
- **value_1** (*string, (optional)*) – Value, Toggle enum
- **value_2** (*string, (optional)*) – Value, Toggle enum

File [startup/bl_operators/wm.py:357](#)

`bpy.ops.wm.copy_prev_settings()`
Copy settings from previous version

File [startup/bl_operators/wm.py:1151](#)

`bpy.ops.wm.debug_menu(debug_value=0)`
Open a popup to set the debug level

Parameters `debug_value` (*int in [-10000, 10000], (optional)*) – Debug Value

`bpy.ops.wm.dependency_relations()`
Print dependency graph relations to the console

`bpy.ops.wm.doc_edit(doc_id="", doc_new="")`
Load online reference docs

Parameters

- `doc_id` (*string, (optional)*) – Doc ID
- `doc_new` (*string, (optional)*) – Edit Description

File [startup/bl_operators/wm.py:856](#)

`bpy.ops.wm.doc_view(doc_id="")`
Load online reference docs

Parameters `doc_id` (*string, (optional)*) – Doc ID

File [startup/bl_operators/wm.py:803](#)

`bpy.ops.wm.interaction_preset_add(name="", remove_active=False)`
Add an Application Interaction Preset

Parameters `name` (*string, (optional)*) – Name, Name of the preset, used to make the path name

File [startup/bl_operators/presets.py:50](#)

`bpy.ops.wm.keyconfig_activate(filepath="")`
Undocumented ([contribute](#))

Parameters `filepath` (*string, (optional)*) – File Path

File [startup/bl_operators/wm.py:1092](#)

`bpy.ops.wm.keyconfig_export(filepath="keymap.py", filter_folder=True, filter_text=True, filter_python=True)`
Export key configuration to a python script

Parameters

- `filepath` (*string, (optional)*) – File Path, Filepath to write file to
- `filter_folder` (*boolean, (optional)*) – Filter folders
- `filter_text` (*boolean, (optional)*) – Filter text
- `filter_python` (*boolean, (optional)*) – Filter python

File [startup/bl_operators/wm.py:1293](#)

`bpy.ops.wm.keyconfig_import(filepath="keymap.py", filter_folder=True, filter_text=True, filter_python=True, keep_original=True)`
Import key configuration from a python script

Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath to write file to
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filter_text** (*boolean, (optional)*) – Filter text
- **filter_python** (*boolean, (optional)*) – Filter python
- **keep_original** (*boolean, (optional)*) – Keep original, Keep original file after copying to configuration folder

File [startup/bl_operators/wm.py:1231](#)

`bpy.ops.wm.keyconfig_preset_add` (*name=""*, *remove_active=False*)
Add a Keyconfig Preset

Parameters **name** (*string, (optional)*) – Name, Name of the preset, used to make the path name

File [startup/bl_operators/presets.py:50](#)

`bpy.ops.wm.keyconfig_remove` ()
Remove key config

File [startup/bl_operators/wm.py:1419](#)

`bpy.ops.wm.keyconfig_test` ()
Test keyconfig for conflicts

File [startup/bl_operators/wm.py:1188](#)

`bpy.ops.wm.keyitem_add` ()
Add key map item

File [startup/bl_operators/wm.py:1370](#)

`bpy.ops.wm.keyitem_remove` (*item_id=0*)
Remove key map item

Parameters **item_id** (*int in [-inf, inf], (optional)*) – Item Identifier, Identifier of the item to remove

File [startup/bl_operators/wm.py:1401](#)

`bpy.ops.wm.keyitem_restore` (*item_id=0*)
Restore key map item

Parameters **item_id** (*int in [-inf, inf], (optional)*) – Item Identifier, Identifier of the item to remove

File [startup/bl_operators/wm.py:1355](#)

`bpy.ops.wm.keymap_restore` (*all=False*)
Restore key map(s)

Parameters **all** (*boolean, (optional)*) – All Keymaps, Restore all keymaps to default

File [startup/bl_operators/wm.py:1327](#)

`bpy.ops.wm.link_append` (*filepath=""*, *directory=""*, *filename=""*, *files=None*, *filter_blender=True*, *filter_image=False*, *filter_movie=False*, *filter_python=False*, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*, *filter_folder=True*, *filemode=1*, *relative_path=True*, *link=True*, *autoselect=True*, *active_layer=True*, *instance_groups=True*)
Link or Append from a Library .blend file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **directory** (*string, (optional)*) – Directory, Directory of the file

- **filename** (*string, (optional)*) – File Name, Name of the file
- **files** (*bpy_prop_collection of OperatorFileListElement, (optional)*) – Files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **relative_path** (*boolean, (optional)*) – Relative Path, Select the file relative to the blend file
- **link** (*boolean, (optional)*) – Link, Link the objects or datablocks rather than appending
- **autoselect** (*boolean, (optional)*) – Select, Select the linked objects
- **active_layer** (*boolean, (optional)*) – Active Layer, Put the linked objects on the active layer
- **instance_groups** (*boolean, (optional)*) – Instance Groups, Create instances for each group as a DupliGroup

`bpy.ops.wm.memory_statistics()`
Print memory statistics to the console

`bpy.ops.wm.ndof_sensitivity_change(decrease=True, fast=False)`
Change NDOF sensitivity

Parameters

- **decrease** (*boolean, (optional)*) – Decrease NDOF sensitivity, If true then action decreases NDOF sensitivity instead of increasing
- **fast** (*boolean, (optional)*) – Fast NDOF sensitivity change, If true then sensitivity changes 50%, otherwise 10%

`bpy.ops.wm.open_mainfile(filepath="", filter_blender=True, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=8, load_ui=True, use_scripts=True)`

Open a Blender file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files

- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **load_ui** (*boolean, (optional)*) – Load UI, Load user interface setup in the .blend file
- **use_scripts** (*boolean, (optional)*) – Trusted Source, Allow blend file execute scripts automatically, default available from system preferences

`bpy.ops.wm.operator_cheat_sheet` ()
Undocumented ([contribute](#))

File `startup/bl_operators/wm.py:1430`

`bpy.ops.wm.operator_preset_add` (*name=""*, *remove_active=False*, *operator=""*)
Add an Application Interaction Preset

Parameters

- **name** (*string, (optional)*) – Name, Name of the preset, used to make the path name
- **operator** (*string, (optional)*) – Operator

File `startup/bl_operators/presets.py:50`

`bpy.ops.wm.path_open` (*filepath=""*)
Open a path in a file browser

Parameters **filepath** (*string, (optional)*) – File Path

File `startup/bl_operators/wm.py:756`

`bpy.ops.wm.properties_add` (*data_path=""*)
Internal use (edit a property `data_path`)

Parameters **data_path** (*string, (optional)*) – Property Edit, Property `data_path` edit

File `startup/bl_operators/wm.py:1033`

`bpy.ops.wm.properties_context_change` (*context=""*)
Change the context tab in a Properties Window

Parameters **context** (*string, (optional)*) – Context

File `startup/bl_operators/wm.py:1063`

`bpy.ops.wm.properties_edit` (*data_path=""*, *property=""*, *value=""*, *min=0.0*, *max=1.0*, *description=""*)
Internal use (edit a property `data_path`)

Parameters

- **data_path** (*string, (optional)*) – Property Edit, Property `data_path` edit
- **property** (*string, (optional)*) – Property Name, Property name edit

- **value** (*string, (optional)*) – Property Value, Property value edit
- **min** (*float in [-inf, inf], (optional)*) – Min
- **max** (*float in [-inf, inf], (optional)*) – Max
- **description** (*string, (optional)*) – Tip

File `startup/bl_operators/wm.py:954`

`bpy.ops.wm.properties_remove` (*data_path=""*, *property=""*)
Internal use (edit a property data_path)

Parameters

- **data_path** (*string, (optional)*) – Property Edit, Property data_path edit
- **property** (*string, (optional)*) – Property Name, Property name edit

File `startup/bl_operators/wm.py:1076`

`bpy.ops.wm.quit_blender` ()
Quit Blender

`bpy.ops.wm.radial_control` (*data_path=""*, *rotation_path=""*, *color_path=""*, *fill_color_path=""*,
zoom_path="", *image_id=""*)
Undocumented ([contribute](#))

Parameters

- **data_path** (*string, (optional)*) – Data Path, Path of property to be set by the radial control
- **rotation_path** (*string, (optional)*) – Rotation Path, Path of property used to rotate the texture display
- **color_path** (*string, (optional)*) – Color Path, Path of property used to set the color of the control
- **fill_color_path** (*string, (optional)*) – Fill Color Path, Path of property used to set the fill color of the control
- **zoom_path** (*string, (optional)*) – Zoom Path, Path of property used to set the zoom level for the control
- **image_id** (*string, (optional)*) – Image ID, Path of ID that is used to generate an image for the control

`bpy.ops.wm.read_factory_settings` ()
Load default file and user preferences

`bpy.ops.wm.read_homefile` ()
Open the default file (doesn't save the current file)

`bpy.ops.wm.recover_auto_save` (*filepath=""*, *filter_blender=True*, *filter_image=False*, *filter_movie=False*,
filter_python=False, *filter_font=False*, *filter_sound=False*, *filter_text=False*, *filter_btx=False*, *filter_collada=False*,
filter_folder=False, *filemode=8*)
Open an automatically saved file to recover it

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files

- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file

`bpy.ops.wm.recover_last_session()`
Open the last closed file (“quit.blend”)

`bpy.ops.wm.redraw_timer(type='DRAW', iterations=10)`
Simple redraw timer to test the speed of updating the interface

Parameters

- **type** (*enum in ['DRAW', 'DRAW_SWAP', 'DRAW_WIN', 'DRAW_WIN_SWAP', 'ANIM_STEP', 'ANIM_PLAY', 'UNDO'], (optional)*) – Type
 - DRAW Draw Region, Draw Region.
 - DRAW_SWAP Draw Region + Swap, Draw Region and Swap.
 - DRAW_WIN Draw Window, Draw Window.
 - DRAW_WIN_SWAP Draw Window + Swap, Draw Window and Swap.
 - ANIM_STEP Anim Step, Animation Steps.
 - ANIM_PLAY Anim Play, Animation Playback.
 - UNDO Undo/Redo, Undo/Redo.
- **iterations** (*int in [1, inf], (optional)*) – Iterations, Number of times to redraw

`bpy.ops.wm.save_as_mainfile(filepath="", check_existing=True, filter_blender=True, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=8, compress=False, relative_remap=True, copy=False)`

Save the current file in the desired location

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files

- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **compress** (*boolean, (optional)*) – Compress, Write compressed .blend file
- **relative_remap** (*boolean, (optional)*) – Remap Relative, Remap relative paths when saving in a different directory
- **copy** (*boolean, (optional)*) – Save Copy, Save a copy of the actual working state but does not make saved file active

`bpy.ops.wm.save_homefile()`
Make the current file the default .blend file

`bpy.ops.wm.save_mainfile(filepath="", check_existing=True, filter_blender=True, filter_image=False, filter_movie=False, filter_python=False, filter_font=False, filter_sound=False, filter_text=False, filter_btx=False, filter_collada=False, filter_folder=True, filemode=8, compress=False, relative_remap=False)`

Save the current Blender file

Parameters

- **filepath** (*string, (optional)*) – File Path, Path to file
- **check_existing** (*boolean, (optional)*) – Check Existing, Check and warn on overwriting existing files
- **filter_blender** (*boolean, (optional)*) – Filter .blend files
- **filter_image** (*boolean, (optional)*) – Filter image files
- **filter_movie** (*boolean, (optional)*) – Filter movie files
- **filter_python** (*boolean, (optional)*) – Filter python files
- **filter_font** (*boolean, (optional)*) – Filter font files
- **filter_sound** (*boolean, (optional)*) – Filter sound files
- **filter_text** (*boolean, (optional)*) – Filter text files
- **filter_btx** (*boolean, (optional)*) – Filter btx files
- **filter_collada** (*boolean, (optional)*) – Filter COLLADA files
- **filter_folder** (*boolean, (optional)*) – Filter folders
- **filemode** (*int in [1, 9], (optional)*) – File Browser Mode, The setting for the file browser mode to load a .blend file, a library or a special file
- **compress** (*boolean, (optional)*) – Compress, Write compressed .blend file
- **relative_remap** (*boolean, (optional)*) – Remap Relative, Remap relative paths when saving in a different directory

`bpy.ops.wm.search_menu()`
Undocumented ([contribute](#))

`bpy.ops.wm.splash()`
 Opens a blocking popup region with release info

`bpy.ops.wm.sysinfo()`
 Generate System Info

File `startup/bl_operators/wm.py:1140`

`bpy.ops.wm.url_open(url="")`
 Open a website in the Webbrowser

Parameters `url` (*string, (optional)*) – URL, URL to open

File `startup/bl_operators/wm.py:739`

`bpy.ops.wm.window_duplicate()`
 Duplicate the current Blender window

`bpy.ops.wm.window_fullscreen_toggle()`
 Toggle the current window fullscreen

World Operators

`bpy.ops.world.new()`
 Add a new world

2.4 Types (bpy.types)

2.4.1 Action(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Action` (*ID*)

A collection of F-Curves for animation

fcurves

The individual F-Curves that make up the Action

Type `ActionFCurves` `bpy_prop_collection` of `FCurve`, (readonly)

frame_range

The final frame range of all F-Curves within this action

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`, (readonly)

groups

Convenient groupings of F-Curves

Type `ActionGroups` `bpy_prop_collection` of `ActionGroup`, (readonly)

id_root

Type of ID-block that action can be used on - DO NOT CHANGE UNLESS YOU KNOW WHAT YOU'RE DOING

Type enum in `['ACTION', 'ARMATURE', 'BRUSH', 'CAMERA', 'CURVE', 'FONT', 'GREASEPENCIL', 'GROUP', 'IMAGE', 'KEY', 'LAMP', 'LIBRARY', 'LATTICE', 'MATERIAL', 'META', 'MESH', 'NODETREE', 'OBJECT', 'PARTICLE', 'SCENE', 'SCREEN', 'SPEAKER', 'SOUND', 'TEXT', 'TEXTURE', 'WORLD', 'WINDOWMANAGER']`, default `'ACTION'`

pose_markers

Markers specific to this Action, for labeling poses

Type `ActionPoseMarkers` `bpy_prop_collection` of `TimelineMarker`, (read-only)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `ActionActuator.action`
- `ActionConstraint.action`
- `AnimData.action`
- `BlendData.actions`
- `BlendDataActions.new`
- `BlendDataActions.remove`
- `NlaStrip.action`
- `NlaStrips.new`
- `Object.pose_library`

- `ShapeActionActuator.action`
- `SpaceDopeSheetEditor.action`

2.4.2 ActionActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ActionActuator` (*Actuator*)

Actuator to control the object movement

action

Type `Action`

apply_to_children

Update Action on all children Objects as well

Type `boolean`, default `False`

frame_blend_in

Number of frames of motion blending

Type `int` in `[0, 32767]`, default `0`

frame_end

Type `float` in `[-inf, inf]`, default `0.0`

frame_property

Assign the action's current frame number to this property

Type `string`, default `""`

frame_start

Type `float` in `[-inf, inf]`, default `0.0`

layer

The animation layer to play the action on

Type `int` in `[0, 7]`, default `0`

layer_weight

How much of the previous layer to blend into this one (0 = add mode)

Type `float` in `[0, 1]`, default `0.0`

play_mode

Action playback type

Type `enum` in `['PLAY', 'PINGPONG', 'FLIPPER', 'LOOPSTOP', 'LOOPEND', 'PROPERTY']`, default `'PLAY'`

priority

Execution priority - lower numbers will override actions with higher numbers. With 2 or more actions at once, the overriding channels must be lower in the stack

Type `int` in `[0, 100]`, default `0`

property

Use this property to define the Action position

Type `string`, default `""`

use_additive

Action is added to the current loc/rot/scale in global or local coordinate according to Local flag

Type boolean, default False

use_continue_last_frame

Restore last frame when switching on/off, otherwise play from the start each time

Type boolean, default False

use_force

Apply Action as a global or local force depending on the local option (dynamic objects only)

Type boolean, default False

use_local

Let the Action act in local coordinates, used in Force and Add mode

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.3 ActionConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.ActionConstraint` (*Constraint*)

Map an action to the transform axes of a bone

action

The constraining action

Type `Action`

frame_end

Last frame of the Action to use

Type `int` in `[-300000, 300000]`, default `0`

frame_start

First frame of the Action to use

Type `int` in `[-300000, 300000]`, default `0`

max

Maximum value for target channel range

Type `float` in `[-1000, 1000]`, default `0.0`

min

Minimum value for target channel range

Type `float` in `[-1000, 1000]`, default `0.0`

subtarget

Type `string`, default `""`

target

Target Object

Type `Object`

transform_channel

Transformation channel from the target that is used to key the Action

Type `enum` in `['LOCATION_X', 'LOCATION_Y', 'LOCATION_Z', 'ROTATION_X', 'ROTATION_Y', 'ROTATION_Z', 'SCALE_X', 'SCALE_Y', 'SCALE_Z']`, default `'ROTATION_X'`

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.4 ActionFCurves(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ActionFCurves` (*bpy_struct*)

Collection of action F-Curves

new (*data_path*, *index=0*, *action_group=""*)

Add a keyframe to the F-Curve

Parameters

- **data_path** (*string*) – Data Path, F-Curve data path to use
- **index** (*int in [0, inf]*, (*optional*)) – Index, Array index
- **action_group** (*string*, (*optional*)) – Action Group, Action group to add this F-Curve into

Returns Newly created F-Curve

Return type `FCurve`

remove (*fcurve*)

Remove action group

Parameters *fcurve* (`FCurve`, (never `None`)) – F-Curve to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.fcurves`

2.4.5 ActionGroup(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ActionGroup` (*bpy_struct*)
Groups of F-Curves

channels

F-Curves in this group

Type `bpy_prop_collection` of `FCurve`, (readonly)

custom_color

Index of custom color set

Type `int` in `[-inf, inf]`, default `0`

lock

Action Group is locked

Type `boolean`, default `False`

name

Type `string`, default `""`

select

Action Group is selected

Type `boolean`, default `False`

show_expanded

Action Group is expanded

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.groups`
- `ActionGroups.new`
- `ActionGroups.remove`
- `FCurve.group`

2.4.6 ActionGroups(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ActionGroups` (*bpy_struct*)

Collection of action groups

new (*name*)

Add a keyframe to the curve

Parameters *name* (*string*) – New name for the action group

Returns Newly created action group

Return type `ActionGroup`

remove (*action_group*)

Remove action group

Parameters *action_group* (`ActionGroup`, (never `None`)) – Action group to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.groups`

2.4.7 ActionPoseMarkers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ActionPoseMarkers` (*bpy_struct*)

Collection of timeline markers

active

Active pose marker for this Action

Type `TimelineMarker`

active_index

Index of active pose marker

Type `int` in `[-inf, inf]`, default 0

new (*name*)

Add a pose marker to the action

Parameters **name** (*string*) – New name for the marker (not unique)

Returns Newly created marker

Return type `TimelineMarker`

remove (*marker*)

Remove a timeline marker

Parameters **marker** (`TimelineMarker`, (never `None`)) – Timeline marker to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.pose_markers`

2.4.8 Actuator(`bpy_struct`)

base class — `bpy_struct`

subclasses — `ShapeActionActuator`, `VisibilityActuator`, `MessageActuator`, `RandomActuator`, `Filter2DActuator`, `GameActuator`, `CameraActuator`, `SteeringActuator`, `ArmatureActuator`, `SoundActuator`, `ParentActuator`, `SceneActuator`, `StateActuator`, `ActionActuator`, `ConstraintActuator`, `PropertyActuator`, `ObjectActuator`, `EditObjectActuator`

class `bpy.types.Actuator` (*`bpy_struct`*)

Actuator to apply actions in the game engine

name

Type string, default ""

pin

Display when not linked to a visible states controller

Type boolean, default False

show_expanded

Set actuator expanded in the user interface

Type boolean, default False

type

Type enum in ['ACTION', 'ARMATURE', 'CAMERA', 'CONSTRAINT', 'EDIT_OBJECT', 'FILTER_2D', 'GAME', 'MESSAGE', 'MOTION', 'PARENT', 'PROPERTY', 'RANDOM', 'SCENE', 'SOUND', 'STATE', 'VISIBILITY', 'STEERING'], default 'MOTION'

link (*controller*)

Link the actuator to a controller

Parameters **controller** (*Controller*) – Controller to link to

unlink (*controller*)

Unlink the actuator from a controller

Parameters **controller** (*Controller*) – Controller to unlink from

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Controller.link`
- `Controller.unlink`
- `GameObjectSettings.actuators`

2.4.9 ActuatorSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.ActuatorSensor` (*Sensor*)

Sensor to detect state modifications of actuators

actuator

Actuator name, actuator active state modifications will be detected

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.10 Addon(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Addon` (`bpy_struct`)
Python addons to be loaded automatically

module

Module name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Addons.new`
- `Addons.remove`
- `UserPreferences.addons`

2.4.11 Addons(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Addons` (*bpy_struct*)

Collection of addons

classmethod `new` ()

Add a new addon

Returns Addon datablock

Return type `Addon`

classmethod `remove` (*addon*)

Remove addon

Parameters `addon` (`Addon`, (never `None`)) – Addon to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.addons`

2.4.12 AdjustmentSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.AdjustmentSequence` (*Sequence*)
Sequence strip to perform filter adjustments to layers below

animation_offset_end

Animation end offset (trim end)

Type int in [0, inf], default 0

animation_offset_start

Animation start offset (trim start)

Type int in [0, inf], default 0

color_balance

Type `SequenceColorBalance`, (readonly)

color_multiply

Type float in [0, 20], default 0.0

color_saturation

Type float in [0, 20], default 0.0

crop

Type `SequenceCrop`, (readonly)

proxy

Type `SequenceProxy`, (readonly)

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

transform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.13 AlwaysSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.AlwaysSensor` (*Sensor*)
 Sensor to generate continuous pulses

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.14 AndController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.AndController` (*Controller*)
 Controller passing on events based on a logical AND operation

Inherited Properties

- `bpy_struct.id_data`

- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.15 AnimData(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.AnimData` (*`bpy_struct`*)
Animation data for datablock

action

Active Action for this datablock

Type `Action`

action_blend_type

Method used for combining Active Action's result with result of NLA stack

- **REPLACE** Replace, Result strip replaces the accumulated results by amount specified by influence.
- **ADD** Add, Weighted result of strip is added to the accumulated results.
- **SUBTRACT** Subtract, Weighted result of strip is removed from the accumulated results.
- **MULITPLY** Multiply, Weighted result of strip is multiplied with the accumulated results.

Type enum in ['REPLACE', 'ADD', 'SUBTRACT', 'MULITPLY'], default 'REPLACE'

action_extrapolation

Action to take for gaps past the Active Action's range (when evaluating with NLA)

- **NOTHING** Nothing, Strip has no influence past its extents.

- HOLD** Hold, Hold the first frame if no previous strips in track, and always hold last frame.
- HOLD_FORWARD** Hold Forward, Only hold last frame.

Type enum in ['NOTHING', 'HOLD', 'HOLD_FORWARD'], default 'HOLD'

action_influence

Amount the Active Action contributes to the result of the NLA stack

Type float in [0, 1], default 1.0

drivers

The Drivers/Expressions for this datablock

Type `AnimDataDrivers` `bpy_prop_collection` of `FCurve`, (readonly)

nla_tracks

NLA Tracks (i.e. Animation Layers)

Type `NlaTracks` `bpy_prop_collection` of `NlaTrack`, (readonly)

use_nla

NLA stack is evaluated when evaluating this block

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Armature.animation_data`
- `Camera.animation_data`
- `Curve.animation_data`
- `ID.animation_data_create`

- `Key.animation_data`
- `Lamp.animation_data`
- `Lattice.animation_data`
- `Material.animation_data`
- `Mesh.animation_data`
- `MetaBall.animation_data`
- `NodeTree.animation_data`
- `Object.animation_data`
- `ParticleSystem.animation_data`
- `Scene.animation_data`
- `Speaker.animation_data`
- `Texture.animation_data`
- `World.animation_data`

2.4.16 AnimDataDrivers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.AnimDataDrivers` (*bpy_struct*)

Collection of Driver F-Curves

from_existing (*src_driver=None*)

Add a new driver given an existing one

Parameters `src_driver` (`FCurve`, (optional)) – Existing Driver F-Curve to use as template for a new one

Returns New Driver F-Curve

Return type `FCurve`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AnimData.drivers`

2.4.17 AnimViz(bpy_struct)

base class — `bpy_struct`

class `bpy.types.AnimViz` (*bpy_struct*)
Settings for the visualisation of motion

motion_path

Motion Path settings for visualisation

Type `AnimVizMotionPaths`, (readonly, never None)

onion_skin_frames

Onion Skinning (ghosting) settings for visualisation

Type `AnimVizOnionSkinning`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.animation_visualisation`
- `Pose.animation_visualisation`

2.4.18 AnimVizMotionPaths(bpy_struct)

base class — `bpy_struct`

class `bpy.types.AnimVizMotionPaths` (*bpy_struct*)

Motion Path settings for animation visualisation

bake_location

When calculating Bone Paths, use Head or Tips

- HEADS Heads, Calculate bone paths from heads.
- TAILS Tails, Calculate bone paths from tails.

Type enum in ['HEADS', 'TAILS'], default 'TAILS'

frame_after

Number of frames to show after the current frame (only for 'Around Current Frame' Onion-skinning method)

Type int in [1, 150000], default 0

frame_before

Number of frames to show before the current frame (only for 'Around Current Frame' Onion-skinning method)

Type int in [1, 150000], default 0

frame_end

End frame of range of paths to display/calculate (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

frame_start

Starting frame of range of paths to display/calculate (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

frame_step

Number of frames between paths shown (not for 'On Keyframes' Onion-skinning method)

Type int in [1, 100], default 0

show_frame_numbers

Show frame numbers on Motion Paths

Type boolean, default False

show_keyframe_action_all

For bone motion paths, search whole Action for keyframes instead of in group with matching name only (is slower)

Type boolean, default False

show_keyframe_highlight

Emphasize position of keyframes on Motion Paths

Type boolean, default False

show_keyframe_numbers

Show frame numbers of Keyframes on Motion Paths

Type boolean, default False

type

Type of range to show for Motion Paths

- `CURRENT_FRAME` Around Frame, Display Paths of poses within a fixed number of frames around the current frame.
- `RANGE` In Range, Display Paths of poses within specified range.

Type enum in [`'CURRENT_FRAME'`, `'RANGE'`], default `'RANGE'`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AnimViz.motion_path`

2.4.19 AnimVizOnionSkinning(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.AnimVizOnionSkinning` (`bpy_struct`)

Onion Skinning settings for animation visualisation

frame_after

Number of frames to show after the current frame (only for 'Around Current Frame' Onion-skinning method)

Type int in [0, 30], default 0

frame_before

Number of frames to show before the current frame (only for 'Around Current Frame' Onion-skinning method)

Type int in [0, 30], default 0

frame_end

End frame of range of Ghosts to display (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

frame_start

Starting frame of range of Ghosts to display (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

frame_step

Number of frames between ghosts shown (not for 'On Keyframes' Onion-skinning method)

Type int in [1, 20], default 0

show_only_selected

For Pose-Mode drawing, only draw ghosts for selected bones

Type boolean, default False

type

Method used for determining what ghosts get drawn

- NONE No Ghosts, Do not show any ghosts.
- CURRENT_FRAME Around Current Frame, Show ghosts from around the current frame.
- RANGE In Range, Show ghosts for the specified frame range.
- KEYS On Keyframes, Show ghosts on keyframes.

Type enum in ['NONE', 'CURRENT_FRAME', 'RANGE', 'KEYS'], default 'NONE'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AnimViz.onion_skin_frames`

2.4.20 AnyType(bpy_struct)

base class — `bpy_struct`

class `bpy.types.AnyType` (*bpy_struct*)
RNA type used for pointers to any possible data

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyingSetInfo.generate`
- `UILayout.context_pointer_set`
- `UILayout.prop`
- `UILayout.prop_enum`
- `UILayout.prop_menu_enum`
- `UILayout.prop_search`
- `UILayout.prop_search`
- `UILayout.props_enum`
- `UILayout.template_ID`
- `UILayout.template_ID_preview`
- `UILayout.template_any_ID`
- `UILayout.template_color_ramp`
- `UILayout.template_color_wheel`
- `UILayout.template_curve_mapping`
- `UILayout.template_histogram`

- `UILayout.template_image`
- `UILayout.template_layers`
- `UILayout.template_layers`
- `UILayout.template_list`
- `UILayout.template_list`
- `UILayout.template_marker`
- `UILayout.template_movieclip`
- `UILayout.template_path_builder`
- `UILayout.template_track`
- `UILayout.template_vectorscope`
- `UILayout.template_waveform`

2.4.21 Area(bpy_struct)

base class — `bpy_struct`

class `bpy.types.Area` (*bpy_struct*)

Area in a subdivided screen, containing an editor

height

Area height

Type `int` in `[0, 32767]`, default `0`, (readonly)

regions

Regions this area is subdivided in

Type `bpy_prop_collection` of `Region`, (readonly)

show_menus

Show menus in the header

Type `boolean`, default `False`

spaces

Spaces contained in this area, the first being the active space (NOTE: Useful for example to restore a previously used 3D view space in a certain area to get the old view orientation)

Type `AreaSpaces` `bpy_prop_collection` of `Space`, (readonly)

type

Space type

Type `enum` in `['EMPTY', 'VIEW_3D', 'GRAPH_EDITOR', 'OUTLINER', 'PROPERTIES', 'FILE_BROWSER', 'IMAGE_EDITOR', 'INFO', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'DOPESHEET_EDITOR', 'NLA_EDITOR', 'TIMELINE', 'NODE_EDITOR', 'LOGIC_EDITOR', 'CONSOLE', 'USER_PREFERENCES', 'CLIP_EDITOR']`, default `'EMPTY'`

width

Area width

Type `int` in `[0, 32767]`, default `0`, (readonly)

tag_redraw ()

`tag_redraw`

header_text_set (*text=""*)

Set the header text

Parameters `text` (*string, (optional)*) – Text, New string for the header, no argument clears the text

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.area`
- `Screen.areas`

2.4.22 AreaLamp(Lamp)

base classes — `bpy_struct`, `ID`, `Lamp`

class `bpy.types.AreaLamp` (*Lamp*)
Directional area lamp

gamma

Light gamma correction value

Type float in [-inf, inf], default 0.0

shadow_adaptive_threshold

Threshold for Adaptive Sampling (Raytraced shadows)

Type float in [0, 1], default 0.0

shadow_color

Color of shadows cast by the lamp

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

shadow_method

Method to compute lamp shadow with

- NOSHADOW No Shadow.
- RAY_SHADOW Ray Shadow, Use ray tracing for shadow.

Type enum in ['NOSHADOW', 'RAY_SHADOW'], default 'NOSHADOW'

shadow_ray_sample_method

Method for generating shadow samples: Adaptive QMC is fastest, Constant QMC is less noisy but slower

Type enum in ['ADAPTIVE_QMC', 'CONSTANT_QMC', 'CONSTANT_JITTERED'], default 'CONSTANT_JITTERED'

shadow_ray_samples_x

Amount of samples taken extra (samples x samples)

Type int in [1, 64], default 0

shadow_ray_samples_y

Amount of samples taken extra (samples x samples)

Type int in [1, 64], default 0

shadow_soft_size

Light size for ray shadow sampling (Raytraced shadows)

Type float in [-inf, inf], default 0.0

shape

Shape of the area lamp

Type enum in ['SQUARE', 'RECTANGLE'], default 'SQUARE'

size

Size of the area of the area Lamp, X direction size for Rectangle shapes

Type float in [-inf, inf], default 0.0

size_y

Size of the area of the area Lamp in the Y direction for Rectangle shapes

Type float in [-inf, inf], default 0.0

use_dither

Use 2x2 dithering for sampling (Constant Jittered sampling)

Type boolean, default False

use_jitter

Use noise for sampling (Constant Jittered sampling)

Type boolean, default False

use_only_shadow

Causes light to cast shadows only without illuminating objects

Type boolean, default False

use_shadow_layer

Causes only objects on the same layer to cast shadows

Type boolean, default False

use_umbra

Emphasize parts that are fully shadowed (Constant Jittered sampling)

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- Lamp.active_texture
- Lamp.active_texture_index
- Lamp.animation_data
- Lamp.color
- Lamp.use_diffuse
- Lamp.distance
- Lamp.energy
- Lamp.use_own_layer
- Lamp.use_negative
- Lamp.node_tree
- Lamp.use_specular
- Lamp.texture_slots
- Lamp.type
- Lamp.use_nodes

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values
- ID.copy
- ID.user_clear
- ID.animation_data_create
- ID.animation_data_clear
- ID.update_tag

2.4.23 AreaSpaces(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.AreaSpaces` (*bpy_struct*)

Collection of spaces

active

Space currently being displayed in this area

Type `Space`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Area.spaces`

2.4.24 Armature(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Armature` (*ID*)

Armature datablock containing a hierarchy of bones, usually used for rigging characters

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

bones

Type `ArmatureBones` `bpy_prop_collection` of `Bone`, (readonly)

deform_method

- BLENDER Blender, Uses Blender’s armature vertex deformation.
- BGE_CPU BGE, Uses vertex deformation code optimized for the BGE.

Type enum in ['BLENDER', 'BGE_CPU'], default 'BLENDER'

draw_type

- OCTAHEDRAL Octahedral, Display bones as octahedral shape (default).
- STICK Stick, Display bones as simple 2D lines with dots.
- BBONE B-Bone, Display bones as boxes, showing subdivision and B-Splines.
- ENVELOPE Envelope, Display bones as extruded spheres, showing deformation influence volume.
- WIRE Wire, Display bones as thin wires, showing subdivision and B-Splines.

Type enum in ['OCTAHEDRAL', 'STICK', 'BBONE', 'ENVELOPE', 'WIRE'], default 'OCTAHEDRAL'

edit_bones

Type `ArmatureEditBones bpy_prop_collection` of `EditBone`, (readonly)

ghost_frame_end

End frame of range of Ghosts to display (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

ghost_frame_start

Starting frame of range of Ghosts to display (not for 'Around Current Frame' Onion-skinning method)

Type int in [-inf, inf], default 0

ghost_size

Frame step for Ghosts (not for 'On Keyframes' Onion-skinning method)

Type int in [1, 20], default 0

ghost_step

Number of frame steps on either side of current frame to show as ghosts (only for 'Around Current Frame' Onion-skinning method)

Type int in [0, 30], default 0

ghost_type

Method of Onion-skinning for active Action

- CURRENT_FRAME Around Frame, Display Ghosts of poses within a fixed number of frames around the current frame.
- RANGE In Range, Display Ghosts of poses within specified range.
- KEYS On Keyframes, Display Ghosts of poses on Keyframes.

Type enum in ['CURRENT_FRAME', 'RANGE', 'KEYS'], default 'CURRENT_FRAME'

layers

Armature layer visibility

Type boolean array of 32 items, default (False, False)

layers_protected

Protected layers in Proxy Instances are restored to Proxy settings on file reload and undo

Type boolean array of 32 items, default (False, False)

pose_position

Show armature in binding pose or final posed state

- POSE Pose Position, Show armature in posed state.
- REST Rest Position, Show Armature in binding pose state. No posing possible.

Type enum in ['POSE', 'REST'], default 'POSE'

show_axes

Draw bone axes

Type boolean, default False

show_bone_custom_shapes

Draw bones with their custom shapes

Type boolean, default False

show_group_colors

Draw bone group colors

Type boolean, default False

show_names

Draw bone names

Type boolean, default False

show_only_ghost_selected

Type boolean, default False

use_auto_ik

Add temporary IK constraints while grabbing bones in Pose Mode

Type boolean, default False

use_deform_delay

Don't deform children when manipulating bones in Pose Mode

Type boolean, default False

use_deform_envelopes

Enable Bone Envelopes when defining deform

Type boolean, default False

use_deform_preserve_volume

Enable deform rotation with Quaternions

Type boolean, default False

use_deform_vertex_groups

Enable Vertex Groups when defining deform

Type boolean, default False

use_mirror_x

Apply changes to matching bone on opposite side of X-Axis

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.armatures`
- `BlendDataArmatures.new`
- `BlendDataArmatures.remove`

2.4.25 ArmatureActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ArmatureActuator` (*Actuator*)

bone

Bone on which the constraint is defined

Type string, default ""

constraint

Name of the constraint to control

Type string, default ""

mode

Type enum in ['RUN', 'ENABLE', 'DISABLE', 'SETTARGET', 'SETWEIGHT'], default 'RUN'

secondary_target

Set this object as the secondary target of the constraint (only IK polar target at the moment)

Type `Object`

target

Set this object as the target of the constraint

Type `Object`

weight

Weight of this constraint

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.26 ArmatureBones(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ArmatureBones` (*bpy_struct*)
Collection of armature bones

active

Armature's active bone

Type `Bone`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Armature.bones`

2.4.27 ArmatureEditBones(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ArmatureEditBones` (*bpy_struct*)
Collection of armature edit bones

active

Armatures active edit bone

Type `EditBone`

new (*name*)

Add a new bone

Parameters **name** (*string*) – New name for the bone

Returns Newly created edit bone

Return type `EditBone`

remove (*bone*)

Remove an existing bone from the armature

Parameters **bone** (`EditBone`, (never `None`)) – `EditBone` to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Armature.edit_bones`

2.4.28 ArmatureModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ArmatureModifier` (*Modifier*)

Armature deformation modifier

invert_vertex_group

Invert vertex group influence

Type boolean, default False

object

Armature object to deform with

Type Object

use_bone_envelopes

Binds Bone envelope to armature modifier

Type boolean, default False

use_deform_preserve_volume

Deform rotation interpolation with quaternions

Type boolean, default False

use_multi_modifier

Use same input as previous modifier, and mix results using overall vgroup

Type boolean, default False

use_vertex_groups

Binds vertex group to armature modifier

Type boolean, default False

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.29 ArmatureSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.ArmatureSensor` (*Sensor*)

Sensor to detect values and changes in values of IK solver

bone

Identify the bone to check value from

Type string, default ""

constraint

Identify the bone constraint to check value from

Type string, default ""

test_type

Type of value and test

Type enum in ['STATECHG', 'LINERRORBELOW', 'LINERRORABOVE', 'ROTERROR-
BELOW', 'ROTERRORABOVE'], default 'STATECHG'

value

Specify value to be used in comparison

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.30 ArrayModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ArrayModifier` (*Modifier*)

Array duplication modifier

constant_offset_displace

Value for the distance between arrayed items

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

count

Number of duplicates to make

Type int in `[1, inf]`, default 0

curve

Curve object to fit array length to

Type `Object`

end_cap

Mesh object to use as an end cap

Type `Object`

fit_length

Length to fit array within

Type float in `[0, inf]`, default 0.0

fit_type

Array length calculation method

- `FIXED_COUNT` Fixed Count, Duplicate the object a certain number of times.
- `FIT_LENGTH` Fit Length, Duplicate the object as many times as fits in a certain length.
- `FIT_CURVE` Fit Curve, Fit the duplicated objects to a curve.

Type enum in `['FIXED_COUNT', 'FIT_LENGTH', 'FIT_CURVE']`, default `'FIXED_COUNT'`

merge_threshold

Limit below which to merge vertices

Type float in `[0, inf]`, default 0.0

offset_object

Uses the location and rotation of another object to determine the distance and rotational change between arrayed items

Type `Object`

relative_offset_displace

The size of the geometry will determine the distance between arrayed items

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

start_cap

Mesh object to use as a start cap

Type `Object`

use_constant_offset

Add a constant offset

Type boolean, default `False`

use_merge_vertices

Merge vertices in adjacent duplicates

Type boolean, default `False`

use_merge_vertices_cap

Merge vertices in first and last duplicates

Type boolean, default `False`

use_object_offset

Add another object's transformation to the total offset

Type boolean, default `False`

use_relative_offset

Add an offset relative to the object's bounding box

Type boolean, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.31 BackgroundImage(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BackgroundImage` (*bpy_struct*)

Image and settings for display in the 3d View background

clip

Movie clip displayed and edited in this space

Type `MovieClip`

clip_user

Parameters defining which frame of the movie clip is displayed

Type `MovieClipUser`, (readonly, never None)

image

Image displayed and edited in this space

Type `Image`

image_user

Parameters defining which layer, pass and frame of the image is displayed

Type `ImageUser`, (readonly, never None)

offset_x

Offset image horizontally from the world origin

Type float in `[-inf, inf]`, default 0.0

offset_y

Offset image vertically from the world origin

Type float in `[-inf, inf]`, default 0.0

opacity

Image opacity to blend the image against the background color

Type float in `[0, 1]`, default 0.0

show_expanded

Show the expanded in the user interface

Type boolean, default False

size

Scaling factor for the background image

Type float in `[0, inf]`, default 0.0

source

Data source used for background

Type enum in ['IMAGE', 'MOVIE'], default 'IMAGE'

use_camera_clip

Use movie clip from active scene camera

Type boolean, default False

view_axis

The axis to display the image on

- LEFT Left, Show background image while looking to the left.
- RIGHT Right, Show background image while looking to the right.
- BACK Back, Show background image in back view.
- FRONT Front, Show background image in front view.
- BOTTOM Bottom, Show background image in bottom view.
- TOP Top, Show background image in top view.
- ALL All Views, Show background image in all views.
- CAMERA Camera, Show background image in camera view.

Type enum in ['LEFT', 'RIGHT', 'BACK', 'FRONT', 'BOTTOM', 'TOP', 'ALL', 'CAMERA'], default 'ALL'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BackgroundImages.add`
- `SpaceView3D.background_images`

2.4.32 BackgroundImages(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BackgroundImages` (*bpy_struct*)

Collection of background images

add()

Add new background image

Returns Image displayed as viewport background

Return type `BackgroundImage`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceView3D.background_images`

2.4.33 BevelModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.BevelModifier` (*Modifier*)

Bevel modifier to make edges and vertices more rounded

angle_limit

Angle above which to bevel edges

Type float in [0, 3.14159], default 0.0

edge_weight_method

What edge weight to use for weighting a vertex

Type enum in ['AVERAGE', 'SHARPEST', 'LARGEST'], default 'AVERAGE'

limit_method

- NONE None, Bevel the entire mesh by a constant amount.
- ANGLE Angle, Only bevel edges with sharp enough angles between faces.
- WEIGHT Weight, Use bevel weights to determine how much bevel is applied; apply them separately in vert/edge select mode.

Type enum in ['NONE', 'ANGLE', 'WEIGHT'], default 'NONE'

use_only_vertices

Bevel verts/corners, not edges

Type boolean, default False

width

Bevel value/amount

Type float in [0, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.34 BezierSplinePoint(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BezierSplinePoint` (*bpy_struct*)

Bezier curve point with two handles

co

Coordinates of the control point

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

handle_left

Coordinates of the first handle

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

handle_left_type

Handle types

Type enum in `['FREE', 'VECTOR', 'ALIGNED', 'AUTO']`, default `'FREE'`

handle_right

Coordinates of the second handle

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

handle_right_type

Handle types

Type enum in `['FREE', 'VECTOR', 'ALIGNED', 'AUTO']`, default `'FREE'`

hide

Visibility status

Type boolean, default `False`

radius

Radius for bevelling

Type float in `[0, inf]`, default `0.0`

select_control_point

Control point selection status

Type boolean, default `False`

select_left_handle

Handle 1 selection status

Type boolean, default `False`

select_right_handle

Handle 2 selection status

Type boolean, default `False`

tilt

Tilt in 3D View

Type float in [-inf, inf], default 0.0

weight

Softbody goal weight

Type float in [0.01, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Spline.bezier_points`

2.4.35 BlendData(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendData` (*bpy_struct*)

Main data structure representing a .blend file and all its datablocks

actions

Action datablocks

Type `BlendDataActions` `bpy_prop_collection` of `Action`, (readonly)

armatures

Armature datablocks

Type `BlendDataArmatures` `bpy_prop_collection` of `Armature`, (readonly)

brushes

Brush datablocks

Type `BlendDataBrushes` `bpy_prop_collection` of `Brush`, (readonly)

cameras

Camera datablocks

Type `BlendDataCameras bpy_prop_collection` of `Camera`, (readonly)**curves**

Curve datablocks

Type `BlendDataCurves bpy_prop_collection` of `Curve`, (readonly)**filepath**

Path to the .blend file

Type string, default "", (readonly)**fonts**

Vector font datablocks

Type `BlendDataFonts bpy_prop_collection` of `VectorFont`, (readonly)**grease_pencil**

Grease Pencil datablocks

Type `BlendDataGreasePencils bpy_prop_collection` of `GreasePencil`, (readonly)**groups**

Group datablocks

Type `BlendDataGroups bpy_prop_collection` of `Group`, (readonly)**images**

Image datablocks

Type `BlendDataImages bpy_prop_collection` of `Image`, (readonly)**is_dirty**

Have recent edits been saved to disk

Type boolean, default False, (readonly)**is_saved**

Has the current session been saved to disk as a .blend file

Type boolean, default False, (readonly)**lamps**

Lamp datablocks

Type `BlendDataLamps bpy_prop_collection` of `Lamp`, (readonly)**lattices**

Lattice datablocks

Type `BlendDataLattices bpy_prop_collection` of `Lattice`, (readonly)**libraries**

Library datablocks

Type `BlendDataLibraries bpy_prop_collection` of `Library`, (readonly)**materials**

Material datablocks

Type `BlendDataMaterials bpy_prop_collection` of `Material`, (readonly)

meshes

Mesh datablocks

Type `BlendDataMeshes` bpy_prop_collection of `Mesh`, (readonly)

metaballs

Metaball datablocks

Type `BlendDataMetaBalls` bpy_prop_collection of `MetaBall`, (readonly)

movieclips

Movie Clip datablocks

Type `BlendDataMovieClips` bpy_prop_collection of `MovieClip`, (readonly)

node_groups

Node group datablocks

Type `BlendDataNodeTrees` bpy_prop_collection of `NodeTree`, (readonly)

objects

Object datablocks

Type `BlendDataObjects` bpy_prop_collection of `Object`, (readonly)

particles

Particle datablocks

Type `BlendDataParticles` bpy_prop_collection of `ParticleSettings`, (readonly)

scenes

Scene datablocks

Type `BlendDataScenes` bpy_prop_collection of `Scene`, (readonly)

screens

Screen datablocks

Type `BlendDataScreens` bpy_prop_collection of `Screen`, (readonly)

scripts

Script datablocks (DEPRECATED)

Type `bpy_prop_collection` of `ID`, (readonly)

shape_keys

Shape Key datablocks

Type `bpy_prop_collection` of `Key`, (readonly)

sounds

Sound datablocks

Type `BlendDataSounds` bpy_prop_collection of `Sound`, (readonly)

speakers

Speaker datablocks

Type `BlendDataSpeakers` bpy_prop_collection of `Speaker`, (readonly)

texts

Text datablocks

Type `BlendDataTexts` bpy_prop_collection of `Text`, (readonly)

textures

Texture datablocks

Type `BlendDataTextures` bpy_prop_collection of `Texture`, (readonly)**window_managers**

Window manager datablocks

Type `BlendDataWindowManagers` bpy_prop_collection of `WindowManager`, (readonly)**worlds**

World datablocks

Type `BlendDataWorlds` bpy_prop_collection of `World`, (readonly)**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.blend_data`
- `RenderEngine.update`

2.4.36 BlendDataActions(bpy_struct)base class — `bpy_struct`**class** `bpy.types.BlendDataActions` (*bpy_struct*)
Collection of actions**is_updated****Type** boolean, default `False`, (readonly)

new (*name*)

Add a new action to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New action datablock

Return type `Action`

remove (*action*)

Remove a action from the current blendfile

Parameters **action** (`Action`, (never `None`)) – Action to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.actions`

2.4.37 `BlendDataArmatures(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.BlendDataArmatures` (*bpy_struct*)

Collection of armatures

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new armature to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New armature datablock

Return type [Armature](#)

remove (*armature*)

Remove a armature from the current blendfile

Parameters **armature** ([Armature](#), (never None)) – Armature to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.armatures`

2.4.38 BlendDataBrushes([bpy_struct](#))

base class — [bpy_struct](#)

class `bpy.types.BlendDataBrushes` ([bpy_struct](#))
Collection of brushes

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new brush to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New brush datablock

Return type `Brush`

remove (*brush*)

Remove a brush from the current blendfile

Parameters **brush** (`Brush`, (never None)) – Brush to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.brushes`

2.4.39 BlendDataCameras(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataCameras` (*bpy_struct*)
 Collection of cameras

is_updated
Type boolean, default False, (readonly)

new (*name*)
 Add a new camera to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New camera datablock

Return type `Camera`

remove (*camera*)
 Remove a camera from the current blendfile

Parameters **camera** (`Camera`, (never None)) – Camera to remove

tag (*value*)
 tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.cameras`

2.4.40 BlendDataCurves(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataCurves` (*bpy_struct*)

Collection of curves

is_updated

Type boolean, default False, (readonly)

new (*name, type*)

Add a new curve to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **type** (*enum in ['CURVE', 'SURFACE', 'FONT']*) – Type, The type of curve to add

Returns New curve datablock

Return type `Curve`

remove (*curve*)

Remove a curve from the current blendfile

Parameters **curve** (`Curve`, (never None)) – Curve to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.curves`

2.4.41 BlendDataFonts(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataFonts` (*bpy_struct*)

Collection of fonts

is_updated

Type boolean, default False, (readonly)

load (*filepath*)

Load a new font into the main database

Parameters `filepath` (*string*) – path of the font to load

Returns New font datablock

Return type `VectorFont`

remove (*vfont*)

Remove a font from the current blendfile

Parameters `vfont` (`VectorFont`, (never None)) – Font to remove

tag (*value*)

tag

Parameters `value` (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.fonts`

2.4.42 BlendDataGreasePencils(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataGreasePencils` (*bpy_struct*)
Collection of grease pencils

is_updated

Type boolean, default False, (readonly)

tag (*value*)

tag

Parameters *value* (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.grease_pencil`

2.4.43 BlendDataGroups(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataGroups` (*bpy_struct*)
 Collection of groups

is_updated
Type boolean, default False, (readonly)

new (*name*)
 Add a new group to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New group datablock

Return type `Group`

remove (*group*)
 Remove a group from the current blendfile

Parameters **group** (`Group`, (never None)) – Group to remove

tag (*value*)
 tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.groups`

2.4.44 BlendDataImages(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataImages` (*bpy_struct*)

Collection of images

is_updated

Type boolean, default False, (readonly)

new (*name, width, height, alpha=False, float_buffer=False*)

Add a new image to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **width** (*int in [1, inf]*) – Width of the image
- **height** (*int in [1, inf]*) – Height of the image
- **alpha** (*boolean, (optional)*) – Alpha, Use alpha channel
- **float_buffer** (*boolean, (optional)*) – Float Buffer, Create an image with floating point color

Returns New image datablock

Return type `Image`

load (*filepath*)

Load a new image into the main database

Parameters **filepath** (*string*) – path of the file to load

Returns New image datablock

Return type `Image`

remove (*image*)

Remove an image from the current blendfile

Parameters **image** (`Image`, (never None)) – Image to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.images`

2.4.45 BlendDataLamps(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataLamps` (*bpy_struct*)
Collection of lamps

is_updated

Type boolean, default False, (readonly)

new (*name, type*)

Add a new lamp to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **type** (*enum in ['POINT', 'SUN', 'SPOT', 'HEMI', 'AREA']*) – Type, The type of texture to add
 - POINT Point, Omnidirectional point light source.
 - SUN Sun, Constant direction parallel ray light source.
 - SPOT Spot, Directional cone light source.
 - HEMI Hemi, 180 degree constant light source.
 - AREA Area, Directional area light source.

Returns New lamp datablock

Return type `Lamp`

remove (*lamp*)

Remove a lamp from the current blendfile

Parameters **lamp** (`Lamp`, (never None)) – Lamp to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.lamps`

2.4.46 BlendDataLattices(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataLattices` (*bpy_struct*)
Collection of lattices

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new lattice to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New lattices datablock

Return type `Lattice`

remove (*lattice*)

Remove a lattice from the current blendfile

Parameters **lattice** (`Lattice`, (never None)) – Lattice to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.lattices`

2.4.47 BlendDataLibraries(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataLibraries` (*bpy_struct*)
Collection of libraries

is_updated

Type boolean, default False, (readonly)

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

load (*filepath*, *link=False*, *relative=False*)

Returns a context manager which exposes 2 library objects on entering. Each object has attributes matching `bpy.data` which are lists of strings to be linked.

Parameters

- **filepath** (*string*) – The path to a blend file.
- **link** (*bool*) – When False reference to the original file is lost.
- **relative** (*bool*) – When True the path is stored relative to the open blend file.

```
import bpy

filepath = "//link_library.blend"

# load a single scene we know the name of.
with bpy.data.libraries.load(filepath) as (data_from, data_to):
    data_to.scenes = ["Scene"]

# load all meshes
with bpy.data.libraries.load(filepath) as (data_from, data_to):
    data_to.meshes = data_from.meshes

# link all objects starting with 'A'
with bpy.data.libraries.load(filepath, link=True) as (data_from, data_to):
    data_to.objects = [name for name in data_from.objects if name.startswith("A")]

# append everything
with bpy.data.libraries.load(filepath) as (data_from, data_to):
    for attr in dir(data_to):
        setattr(data_to, attr, getattr(data_from, attr))

# the loaded objects can be accessed from 'data_to' outside of the context
# since loading the data replaces the strings for the datablocks or None
# if the datablock could not be loaded.
with bpy.data.libraries.load(filepath) as (data_from, data_to):
    data_to.meshes = data_from.meshes
# now operate directly on the loaded data
for mesh in data_to.meshes:
    if mesh is not None:
        print(mesh.name)
```

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.libraries`

2.4.48 BlendDataMaterials(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataMaterials` (*bpy_struct*)
Collection of materials

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new material to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New material datablock

Return type `Material`

remove (*material*)

Remove a material from the current blendfile

Parameters **material** (`Material`, (never None)) – Material to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.materials`

2.4.49 BlendDataMeshes(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataMeshes` (*bpy_struct*)
Collection of meshes

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new mesh to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New mesh datablock

Return type `Mesh`

remove (*mesh*)

Remove a mesh from the current blendfile

Parameters **mesh** (`Mesh`, (never None)) – Mesh to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.meshes`

2.4.50 BlendDataMetaBalls(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataMetaBalls` (*bpy_struct*)
Collection of metaballs

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new metaball to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New metaball datablock

Return type `MetaBall`

remove (*metaball*)

Remove a metaball from the current blendfile

Parameters **metaball** (`MetaBall`, (never None)) – `MetaBall` to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.metaballs`

2.4.51 BlendDataMovieClips(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataMovieClips` (*bpy_struct*)

Collection of movie clips

tag (*value*)

tag

Parameters *value* (*boolean*) – Value

remove (*clip*)

Remove a movie clip from the current blendfile.

Parameters *clip* (`MovieClip`, (never `None`)) – Movie clip to remove

load (*filepath*)

Add a new movie clip to the main database from a file

Parameters *filepath* (*string*) – path for the datablock

Returns New movie clip datablock

Return type `MovieClip`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.movieclips`

2.4.52 BlendDataNodeTrees(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataNodeTrees` (*bpy_struct*)
Collection of node trees

is_updated

Type boolean, default False, (readonly)

new (*name, type*)

Add a new node tree to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **type** (*enum in ['SHADER', 'COMPOSITE', 'TEXTURE']*) – Type, The type of node_group to add

Returns New node tree datablock

Return type `NodeTree`

remove (*tree*)

Remove a node tree from the current blendfile

Parameters **tree** (`NodeTree`, (never None)) – Node tree to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.node_groups`

2.4.53 BlendDataObjects(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataObjects` (*bpy_struct*)
Collection of objects

is_updated

Type boolean, default False, (readonly)

new (*name*, *object_data*)

Add a new object to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **object_data** (*ID*) – Object data or None for an empty object

Returns New object datablock

Return type `Object`

remove (*object*)

Remove a object from the current blendfile

Parameters **object** (`Object`, (never None)) – Object to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.objects`

2.4.54 BlendDataParticles(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataParticles` (*bpy_struct*)

Collection of particle settings

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new particle settings instance to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New particle settings datablock

Return type `ParticleSettings`

remove (*particle*)

Remove a particle settings instance from the current blendfile

Parameters **particle** (`ParticleSettings`, (never None)) – Particle Settings to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.particles`

2.4.55 BlendDataScenes(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataScenes` (*bpy_struct*)
Collection of scenes

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new scene to the main database

Parameters *name* (*string*) – New name for the datablock

Returns New scene datablock

Return type `Scene`

remove (*scene*)

Remove a scene from the current blendfile

Parameters *scene* (`Scene`, (never None)) – Scene to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.scenes`

2.4.56 BlendDataScreens(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataScreens` (*bpy_struct*)
Collection of screens

is_updated

Type boolean, default False, (readonly)

tag (*value*)

tag

Parameters *value* (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `BlendData.screens`

2.4.57 BlendDataSounds(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataSounds` (*bpy_struct*)
Collection of sounds

is_updated

Type boolean, default False, (readonly)

tag (*value*)

tag

Parameters *value* (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.sounds`

2.4.58 BlendDataSpeakers(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataSpeakers` (*bpy_struct*)

Collection of speakers

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new speaker to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New speaker datablock

Return type `Speaker`

remove (*speaker*)

Remove a speaker from the current blendfile

Parameters **speaker** (`Speaker`, (never None)) – Speaker to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.speakers`

2.4.59 BlendDataTexts(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BlendDataTexts` (*bpy_struct*)

Collection of texts

is_updated

Type boolean, default False, (readonly)

new (*name*)

Add a new text to the main database

Parameters **name** (*string*) – New name for the datablock

Returns New text datablock

Return type `Text`

remove (*text*)

Remove a text from the current blendfile

Parameters **text** (`Text`, (never None)) – Text to remove

load (*filepath*)

Add a new text to the main database from a file

Parameters **filepath** (*string*) – path for the datablock

Returns New text datablock

Return type `Text`

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `BlendData.texts`

2.4.60 BlendDataTextures(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataTextures` (*bpy_struct*)

Collection of groups

is_updated

Type boolean, default False, (readonly)

new (*name, type*)

Add a new texture to the main database

Parameters

- **name** (*string*) – New name for the datablock
- **type** (*enum in ['NONE', 'BLEND', 'CLOUDS', 'DISTORTED_NOISE', 'ENVIRONMENT_MAP', 'IMAGE', 'MAGIC', 'MARBLE', 'MUSGRAVE', 'NOISE', 'POINT_DENSITY', 'STUCCI', 'VORONOI', 'VOXEL_DATA', 'WOOD', 'OCEAN']*) – Type, The type of texture to add
 - NONE None.
 - BLEND Blend, Procedural - create a ramp texture.
 - CLOUDS Clouds, Procedural - create a cloud-like fractal noise texture.
 - DISTORTED_NOISE Distorted Noise, Procedural - Noise texture distorted by two noise algorithms.
 - ENVIRONMENT_MAP Environment Map, Create a render of the environment mapped to a texture.
 - IMAGE Image or Movie, Allow for images or movies to be used as textures.
 - MAGIC Magic, Procedural - Color texture based on trigonometric functions.
 - MARBLE Marble, Procedural - Marble-like noise texture with wave generated bands.
 - MUSGRAVE Musgrave, Procedural - Highly flexible fractal noise texture.
 - NOISE Noise, Procedural - Random noise, gives a different result every time, for every frame, for every pixel.
 - POINT_DENSITY Point Density.
 - STUCCI Stucci, Procedural - Create a fractal noise texture.
 - VORONOI Voronoi, Procedural - Create cell-like patterns based on Worley noise.
 - VOXEL_DATA Voxel Data, Create a 3d texture based on volumetric data.
 - WOOD Wood, Procedural - Wave generated bands or rings, with optional noise.
 - OCEAN Ocean.

Returns New texture datablock

Return type `Texture`

remove (*texture*)

Remove a texture from the current blendfile

Parameters **texture** (`Texture`, (never None)) – Texture to remove

tag (*value*)

tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.textures`

2.4.61 BlendDataWindowManagers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlendDataWindowManagers` (*bpy_struct*)

Collection of window managers

is_updated

Type boolean, default False, (readonly)

tag (*value*)

tag

Parameters `value` (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.window_managers`

2.4.62 `BlendDataWorlds(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.BlendDataWorlds` (*bpy_struct*)
Collection of worlds

is_updated

Type `boolean`, default `False`, (readonly)

new (*name*)

Add a new world to the main database

Parameters `name` (*string*) – New name for the datablock

Returns New world datablock

Return type `World`

remove (*world*)

Remove a world from the current blendfile

Parameters `world` (`World`, (never `None`)) – World to remove

tag (*value*)
tag

Parameters **value** (*boolean*) – Value

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.worlds`

2.4.63 BlendTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.BlendTexture` (*Texture*)
Procedural color blending texture

progression

Sets the style of the color blending

- **LINEAR** Linear, Create a linear progression.
- **QUADRATIC** Quadratic, Create a quadratic progression.
- **EASING** Easing, Create a progression easing from one step to the next.
- **DIAGONAL** Diagonal, Create a diagonal progression.
- **SPHERICAL** Spherical, Create a spherical progression.
- **QUADRATIC_SPHERE** Quadratic sphere, Create a quadratic progression in the shape of a sphere.
- **RADIAL** Radial, Create a radial progression.

Type enum in ['LINEAR', 'QUADRATIC', 'EASING', 'DIAGONAL', 'SPHERICAL', 'QUADRATIC_SPHERE', 'RADIAL'], default 'LINEAR'

use_flip_axis

Flips the texture's X and Y axis

- HORIZONTAL Horizontal, Flips the texture's X and Y axis.
- VERTICAL Vertical, Flips the texture's X and Y axis.

Type enum in ['HORIZONTAL', 'VERTICAL'], default 'HORIZONTAL'

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- Texture.animation_data
- Texture.intensity
- Texture.color_ramp
- Texture.contrast
- Texture.factor_blue
- Texture.factor_green
- Texture.factor_red
- Texture.node_tree
- Texture.saturation
- Texture.use_preview_alpha
- Texture.type
- Texture.use_color_ramp
- Texture.use_nodes
- Texture.users_material
- Texture.users_object_modifier
- Texture.users_material
- Texture.users_object_modifier

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.64 BlenderRNA(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BlenderRNA` (*bpy_struct*)
Blender RNA structure definitions

structs

Type `bpy_prop_collection` of `Struct`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.65 BoidRule(bpy_struct)

base class — `bpy_struct`

subclasses — `BoidRuleAvoidCollision`, `BoidRuleAverageSpeed`, `BoidRuleAvoid`, `BoidRuleFight`, `BoidRuleFollowLeader`, `BoidRuleGoal`

class `bpy.types.BoidRule` (*bpy_struct*)

name

Boid rule name

Type string, default ""

type

- **GOAL** Goal, Go to assigned object or loudest assigned signal source.
- **AVOID** Avoid, Get away from assigned object or loudest assigned signal source.
- **AVOID_COLLISION** Avoid Collision, Manoeuvre to avoid collisions with other boids and deflector objects in near future.
- **SEPARATE** Separate, Keep from going through other boids.
- **FLOCK** Flock, Move to center of neighbors and match their velocity.
- **FOLLOW_LEADER** Follow Leader, Follow a boid or assigned object.
- **AVERAGE_SPEED** Average Speed, Maintain speed, flight level or wander.
- **FIGHT** Fight, Go to closest enemy and attack when in range.

Type enum in ['GOAL', 'AVOID', 'AVOID_COLLISION', 'SEPARATE', 'FLOCK', 'FOLLOW_LEADER', 'AVERAGE_SPEED', 'FIGHT'], default 'GOAL', (readonly)

use_in_air

Use rule when boid is flying

Type boolean, default False

use_on_land

Use rule when boid is on land

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BoidSettings.active_boid_state`
- `BoidState.active_boid_rule`
- `BoidState.rules`

2.4.66 BoidRuleAverageSpeed(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleAverageSpeed` (*BoidRule*)

level

How much velocity's z-component is kept constant

Type float in [0, 1], default 0.0

speed

Percentage of maximum speed

Type float in [0, 1], default 0.0

wander

How fast velocity's direction is randomized

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.67 BoidRuleAvoid(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleAvoid` (*BoidRule*)

fear_factor

Avoid object if danger from it is above this threshold

Type float in [0, 100], default 0.0

object

Object to avoid

Type `Object`

use_predict

Predict target movement

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.68 BoidRuleAvoidCollision(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleAvoidCollision` (*BoidRule*)

look_ahead

Time to look ahead in seconds

Type float in [0, 100], default 0.0

use_avoid

Avoid collision with other boids

Type boolean, default False

use_avoid_collision

Avoid collision with deflector objects

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.69 BoidRuleFight(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleFight` (*BoidRule*)

distance

Attack boids at max this distance

Type float in [0, 100], default 0.0

flee_distance

Flee to this distance

Type float in [0, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.70 BoidRuleFollowLeader(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleFollowLeader` (*BoidRule*)

distance

Distance behind leader to follow

Type float in [0, 100], default 0.0

object

Follow this object instead of a boid

Type `Object`

queue_count

How many boids in a line

Type `int` in `[0, 100]`, default `0`

use_line

Follow leader in a line

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.71 BoidRuleGoal(BoidRule)

base classes — `bpy_struct`, `BoidRule`

class `bpy.types.BoidRuleGoal` (*BoidRule*)

object

Goal object

Type `Object`

use_predict

Predict target movement

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `BoidRule.name`
- `BoidRule.use_in_air`
- `BoidRule.use_on_land`
- `BoidRule.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.72 BoidSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BoidSettings` (*`bpy_struct`*)
Settings for boid physics

accuracy

Accuracy of attack

Type float in [0, 1], default 0.0

active_boid_state

Type `BoidRule`, (readonly)

active_boid_state_index

Type int in [0, inf], default 0

aggression

Boid will fight this times stronger enemy

Type float in [0, 100], default 0.0

air_acc_max

Maximum acceleration in air (relative to maximum speed)

Type float in [0, 1], default 0.0

air_ave_max

Maximum angular velocity in air (relative to 180 degrees)

Type float in [0, 1], default 0.0

air_personal_space

Radius of boids personal space in air (% of particle size)

Type float in [0, 10], default 0.0

air_speed_max

Maximum speed in air

Type float in [0, 100], default 0.0

air_speed_min

Minimum speed in air (relative to maximum speed)

Type float in [0, 1], default 0.0

bank

Amount of rotation around velocity vector on turns

Type float in [0, 2], default 0.0

health

Initial boid health when born

Type float in [0, 100], default 0.0

height

Boid height relative to particle size

Type float in [0, 2], default 0.0

land_acc_max

Maximum acceleration on land (relative to maximum speed)

Type float in [0, 1], default 0.0

land_ave_max

Maximum angular velocity on land (relative to 180 degrees)

Type float in [0, 1], default 0.0

land_jump_speed

Maximum speed for jumping

Type float in [0, 100], default 0.0

land_personal_space

Radius of boids personal space on land (% of particle size)

Type float in [0, 10], default 0.0

land_smooth

How smoothly the boids land

Type float in [0, 10], default 0.0

land_speed_max

Maximum speed on land

Type float in [0, 100], default 0.0

land_stick_force

How strong a force must be to start effecting a boid on land

Type float in [0, 1000], default 0.0

pitch

Amount of rotation around side vector

Type float in [0, 2], default 0.0

range

Maximum distance from which a boid can attack

Type float in [0, 100], default 0.0

states

Type `bpy_prop_collection` of `BoidState`, (readonly)

strength

Maximum caused damage on attack per second

Type float in [0, 100], default 0.0

use_climb

Allow boids to climb goal objects

Type boolean, default False

use_flight

Allow boids to move in air

Type boolean, default False

use_land

Allow boids to move on land

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `ParticleSystem.boids`

2.4.73 BoidState(bpy_struct)

base class — `bpy_struct`

class `bpy.types.BoidState` (*bpy_struct*)
Boid state for boid physics

active_boid_rule

Type `BoidRule`, (readonly)

active_boid_rule_index

Type `int` in `[0, inf]`, default `0`

falloff

Type `float` in `[0, 10]`, default `0.0`

name

Boid state name

Type `string`, default `""`

rule_fuzzy

Type `float` in `[0, 1]`, default `0.0`

rules

Type `bpy_prop_collection` of `BoidRule`, (readonly)

ruleset_type

How the rules in the list are evaluated

- **FUZZY** Fuzzy, Rules are gone through top to bottom. Only the first rule that effect above fuzziness threshold is evaluated.
- **RANDOM** Random, A random rule is selected for each boid.
- **AVERAGE** Average, All rules are averaged.

Type `enum` in `['FUZZY', 'RANDOM', 'AVERAGE']`, default `'FUZZY'`

volume

Type `float` in `[0, 100]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BoidSettings.states`

2.4.74 Bone(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Bone` (*bpy_struct*)

Bone in an Armature datablock

bbone_in

Length of first Bezier Handle (for B-Bones only)

Type float in [0, 2], default 0.0

bbone_out

Length of second Bezier Handle (for B-Bones only)

Type float in [0, 2], default 0.0

bbone_segments

Number of subdivisions of bone (for B-Bones only)

Type int in [1, 32], default 0

bbone_x

B-Bone X size

Type float in [0, 1000], default 0.0

bbone_z

B-Bone Z size

Type float in [0, 1000], default 0.0

children

Bones which are children of this bone

Type `bpy_prop_collection` of `Bone`, (readonly)

envelope_distance

Bone deformation distance (for Envelope deform only)

Type float in [0, 1000], default 0.0

envelope_weight

Bone deformation weight (for Envelope deform only)

Type float in [0, 1000], default 0.0

head

Location of head end of the bone relative to its parent

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

head_local

Location of head end of the bone relative to armature

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

head_radius

Radius of head of bone (for Envelope deform only)

Type float in [0, inf], default 0.0

hide

Bone is not visible when it is not in Edit Mode (i.e. in Object or Pose Modes)

Type boolean, default False

hide_select

Bone is able to be selected

Type boolean, default False

layers

Layers bone exists in

Type boolean array of 32 items, default (False, False)

matrix

3x3 bone matrix

Type float array of 9 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_local

4x4 bone matrix relative to armature

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

name

Type string, default ""

parent

Parent bone (in same Armature)

Type `Bone`, (readonly)

select

Type boolean, default False

select_head

Type boolean, default False

select_tail

Type boolean, default False

show_wire

Bone is always drawn as Wireframe regardless of viewport draw mode (useful for non-obstructive custom bone shapes)

Type boolean, default False

tail

Location of tail end of the bone

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

tail_local

Location of tail end of the bone relative to armature

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

tail_radius

Radius of tail of bone (for Envelope deform only)

Type float in $[0, \text{inf}]$, default 0.0

use_connect

When bone has a parent, bone's head is stuck to the parent's tail

Type boolean, default False, (readonly)

use_cyclic_offset

When bone doesn't have a parent, it receives cyclic offset effects

Type boolean, default False

use_deform

Bone does not deform any geometry

Type boolean, default False

use_envelope_multiply

When deforming bone, multiply effects of Vertex Group weights with Envelope influence

Type boolean, default False

use_inherit_rotation

Bone inherits rotation or scale from parent bone

Type boolean, default False

use_inherit_scale

Bone inherits scaling from parent bone

Type boolean, default False

use_local_location

Bone location is set in local space

Type boolean, default False

basename

The name of this bone before any '.' character (readonly)

center

The midpoint between the head and the tail. (readonly)

children

A list of all the bones children. (readonly)

children_recursive

A list of all children from this bone. (readonly)

children_recursive_basename

Returns a chain of children with the same base name as this bone. Only direct chains are supported, forks caused by multiple children with matching base names will terminate the function and not be returned. (readonly)

length

The distance from head to tail, when set the head is moved to fit the length.

parent_recursive

A list of parents, starting with the immediate parent (readonly)

vector

The direction this bone is pointing. Utility function for (tail - head)
(readonly)

x_axis

Vector pointing down the x-axis of the bone. (readonly)

y_axis

Vector pointing down the x-axis of the bone. (readonly)

z_axis

Vector pointing down the x-axis of the bone. (readonly)

evaluate_envelope (*point*)

Calculate bone envelope at given point

Parameters **point** (*float array of 3 items in [-inf, inf]*) – Point, Position in 3d space to evaluate

Returns Factor, Envelope factor

Return type float in [-inf, inf]

parent_index (*parent_test*)

The same as ‘bone in other_bone.parent_recursive’ but saved generating a list.

translate (*vec*)

Utility function to add *vec* to the head and tail of this bone

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Armature.bones`
- `ArmatureBones.active`
- `Bone.children`
- `Bone.parent`
- `PoseBone.bone`

2.4.75 BoneGroup(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BoneGroup` (*bpy_struct*)
Groups of Pose Channels (Bones)

color_set

Custom color set to use

Type enum in ['DEFAULT', 'THEME01', 'THEME02', 'THEME03', 'THEME04', 'THEME05', 'THEME06', 'THEME07', 'THEME08', 'THEME09', 'THEME10', 'THEME11', 'THEME12', 'THEME13', 'THEME14', 'THEME15', 'THEME16', 'THEME17', 'THEME18', 'THEME19', 'THEME20', 'CUSTOM'], default 'DEFAULT'

colors

Copy of the colors associated with the group's color set

Type `ThemeBoneColorSet`, (readonly, never None)

name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BoneGroups.active`
- `Pose.bone_groups`
- `PoseBone.bone_group`

2.4.76 BoneGroups(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.BoneGroups` (*bpy_struct*)
Collection of bone groups

active

Active bone group for this pose

Type `BoneGroup`

active_index

Active index in bone groups array

Type `int` in `[-inf, inf]`, default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Pose.bone_groups`

2.4.77 BooleanModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.BooleanModifier` (*Modifier*)

Boolean operations modifier

object

Mesh object to use for Boolean operation

Type `Object`

operation

- **INTERSECT** Intersect, Keeps the part of the mesh that intersects with the other selected object.
- **UNION** Union, Combines two meshes in an additive way.
- **DIFFERENCE** Difference, Combines two meshes in a subtractive way.

Type enum in ['INTERSECT', 'UNION', 'DIFFERENCE'], default 'INTERSECT'

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.78 BooleanProperty(Property)

base classes — `bpy_struct`, `Property`

class `bpy.types.BooleanProperty` (*Property*)

RNA boolean property definition

array_length

Maximum length of the array, 0 means unlimited

Type `int` in `[0, inf]`, default 0, (readonly)

default

Default value for this number

Type `boolean`, default `False`, (readonly)

default_array

Default value for this array

Type `boolean array of 3 items`, default `(False, False, False)`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.79 Brush(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Brush` (*ID*)

Brush datablock for storing brush settings for painting and sculpting

auto_smooth_factor

Amount of smoothing to automatically apply to each stroke

Type float in [0, 1], default 0.0

blend

Brush blending mode

- **MIX** Mix, Use mix blending mode while painting.
- **ADD** Add, Use add blending mode while painting.
- **SUB** Subtract, Use subtract blending mode while painting.
- **MUL** Multiply, Use multiply blending mode while painting.
- **LIGHTEN** Lighten, Use lighten blending mode while painting.
- **DARKEN** Darken, Use darken blending mode while painting.
- **ERASE_ALPHA** Erase Alpha, Erase alpha while painting.
- **ADD_ALPHA** Add Alpha, Add alpha while painting.

Type enum in ['MIX', 'ADD', 'SUB', 'MUL', 'LIGHTEN', 'DARKEN', 'ERASE_ALPHA', 'ADD_ALPHA'], default 'MIX'

clone_alpha

Opacity of clone image display

Type float in [0, 1], default 0.0

clone_image

Image for clone tool

Type `Image`

clone_offset

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

color

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

crease_pinch_factor

How much the crease brush pinches

Type float in [0, 1], default 0.666667

cursor_color_add

Color of cursor when adding

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

cursor_color_subtract

Color of cursor when subtracting

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

curve

Editable falloff curve

Type `CurveMapping`, (readonly, never None)

direction

- ADD Add, Add effect of brush.
- SUBTRACT Subtract, Subtract effect of brush.

Type enum in ['ADD', 'SUBTRACT'], default 'ADD'

height

Affectable height of brush (layer height for layer tool, i.e.)

Type float in [0, 1], default 0.5

icon_filepath

File path to brush icon

Type string, default ""

image_tool

Type enum in ['DRAW', 'SOFTEN', 'SMEAR', 'CLONE'], default 'DRAW'

jitter

Jitter the position of the brush while painting

Type float in [0, 1], default 0.0

normal_weight

How much grab will pull vertexes out of surface during a grab

Type float in [0, 1], default 0.0

plane_offset

Adjusts plane on which the brush acts towards or away from the object surface

Type float in [-2, 2], default 0.0

plane_trim

If a vertex is further from offset plane than this then it is not affected

Type float in [0, 1], default 0.5

rate

Interval between paints for Airbrush

Type float in [0.0001, 10000], default 0.0

sculpt_plane

Type enum in ['AREA', 'VIEW', 'X', 'Y', 'Z'], default 'AREA'

sculpt_tool

Type enum in ['BLOB', 'CLAY', 'CREASE', 'DRAW', 'FILL', 'FLATTEN', 'GRAB', 'INFLATE', 'LAYER', 'NUDGE', 'PINCH', 'ROTATE', 'SCRAPE', 'SMOOTH', 'SNAKE_HOOK', 'THUMB'], default 'BLOB'

size

Radius of the brush in pixels

Type int in [1, 2000], default 0

smooth_stroke_factor

Higher values give a smoother stroke

Type float in [0.5, 0.99], default 0.0

smooth_stroke_radius

Minimum distance from last point before stroke continues

Type int in [10, 200], default 0

spacing

Spacing between brush daubs as a percentage of brush diameter

Type int in [1, 1000], default 0

strength

How powerful the effect of the brush is when applied

Type float in [0, 10], default 0.5

stroke_method

- DOTS Dots, Apply paint on each mouse move step.
- DRAG_DOT Drag Dot, Allows a single dot to be carefully positioned.
- SPACE Space, Limit brush application to the distance specified by spacing.
- ANCHORED Anchored, Keep the brush anchored to the initial location.
- AIRBRUSH Airbrush, Keep applying paint effect while holding mouse (spray).

Type enum in ['DOTS', 'DRAG_DOT', 'SPACE', 'ANCHORED', 'AIRBRUSH'], default 'DOTS'

texture

Type [Texture](#)

texture_angle_source_no_random

- USER User, Rotate the brush texture by given angle.

- RAKE Rake, Rotate the brush texture to match the stroke direction.

Type enum in ['USER', 'RAKE'], default 'USER'

texture_angle_source_random

- USER User, Rotate the brush texture by given angle.
- RAKE Rake, Rotate the brush texture to match the stroke direction.
- RANDOM Random, Rotate the brush texture at random.

Type enum in ['USER', 'RAKE', 'RANDOM'], default 'USER'

texture_overlay_alpha

Type int in [1, 100], default 0

texture_sample_bias

Value added to texture samples

Type float in [-1, 1], default 0.0

texture_slot

Type BrushTextureSlot, (readonly)

unprojected_radius

Radius of brush in Blender units

Type float in [0.001, inf], default 0.0

use_accumulate

Accumulate stroke dabs on top of each other

Type boolean, default False

use_adaptive_space

Space daubs according to surface orientation instead of screen space

Type boolean, default False

use_airbrush

Keep applying paint effect while holding mouse (spray)

Type boolean, default False

use_alpha

When this is disabled, lock alpha while painting

Type boolean, default False

use_anchor

Keep the brush anchored to the initial location

Type boolean, default False

use_custom_icon

Set the brush icon from an image file

Type boolean, default False

use_edge_to_edge

Drag anchor brush from edge-to-edge

Type boolean, default False

use_fixed_texture

Keep texture origin in fixed position

Type boolean, default False

use_frontface

Brush only affects vertexes that face the viewer

Type boolean, default False

use_inverse_smooth_pressure

Lighter pressure causes more smoothing to be applied

Type boolean, default False

use_locked_size

When locked brush stays same size relative to object; when unlocked brush size is given in pixels

Type boolean, default False

use_offset_pressure

Enable tablet pressure sensitivity for offset

Type boolean, default False

use_original_normal

When locked keep using normal of surface where stroke was initiated

Type boolean, default False

use_paint_image

Use this brush in texture paint mode

Type boolean, default False

use_paint_sculpt

Use this brush in sculpt mode

Type boolean, default False

use_paint_vertex

Use this brush in vertex paint mode

Type boolean, default False

use_paint_weight

Use this brush in weight paint mode

Type boolean, default False

use_persistent

Sculpts on a persistent layer of the mesh

Type boolean, default False

use_plane_trim

Enable Plane Trim

Type boolean, default False

use_pressure_jitter

Enable tablet pressure sensitivity for jitter

Type boolean, default False

use_pressure_size

Enable tablet pressure sensitivity for size

Type boolean, default False

use_pressure_spacing

Enable tablet pressure sensitivity for spacing

Type boolean, default False

use_pressure_strength

Enable tablet pressure sensitivity for strength

Type boolean, default False

use_rake

Rotate the brush texture to match the stroke direction

Type boolean, default False

use_random_rotation

Rotate the brush texture at random

Type boolean, default False

use_restore_mesh

Allows a single dot to be carefully positioned

Type boolean, default False

use_smooth_stroke

Brush lags behind mouse and follows a smoother path

Type boolean, default False

use_space

Limit brush application to the distance specified by spacing

Type boolean, default False

use_space_atten

Automatically adjusts strength to give consistent results for different spacings

Type boolean, default False

use_texture_overlay

Show texture in viewport

Type boolean, default False

use_wrap

Enable torus wrapping while painting

Type boolean, default False

vertex_tool

- MIX Mix, Use mix blending mode while painting.
- ADD Add, Use add blending mode while painting.
- SUB Subtract, Use subtract blending mode while painting.
- MUL Multiply, Use multiply blending mode while painting.
- BLUR Blur, Blur the color with surrounding values.
- LIGHTEN Lighten, Use lighten blending mode while painting.
- DARKEN Darken, Use darken blending mode while painting.

Type enum in ['MIX', 'ADD', 'SUB', 'MUL', 'BLUR', 'LIGHTEN', 'DARKEN'], default 'MIX'

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.brushes`
- `BlendDataBrushes.new`
- `BlendDataBrushes.remove`
- `Paint.brush`

2.4.80 BrushTextureSlot(TextureSlot)

base classes — `bpy_struct`, `TextureSlot`

class `bpy.types.BrushTextureSlot` (*TextureSlot*)
Texture slot for textures in a Brush datablock

angle

Defines brush texture rotation

Type float in [0, 6.28319], default 0.0

map_mode

Type enum in ['FIXED', 'TILED', '3D'], default 'FIXED'

Inherited Properties

- `bpy_struct.id_data`
- `TextureSlot.name`
- `TextureSlot.blend_type`
- `TextureSlot.color`
- `TextureSlot.default_value`
- `TextureSlot.invert`
- `TextureSlot.offset`
- `TextureSlot.output_node`
- `TextureSlot.use_rgb_to_intensity`
- `TextureSlot.scale`
- `TextureSlot.use_stencil`
- `TextureSlot.texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Brush.texture_slot`

2.4.81 BuildModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.BuildModifier` (*Modifier*)
 Build effect modifier

frame_duration
 Specify the total time the build effect requires
Type float in [1, 300000], default 0.0

frame_start
 Specify the start frame of the effect
Type float in [-300000, 300000], default 0.0

seed
 Specify the seed for random if used
Type int in [1, 300000], default 0

use_random_order
 Randomize the faces or edges during build
Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.82 Camera(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Camera` (*ID*)

Camera datablock for storing camera settings

angle

Camera lens field of view in degrees

Type float in [0.00640536, 3.01675], default 0.0

angle_x

Camera lens horizontal field of view in degrees

Type float in [0.00640536, 3.01675], default 0.0

angle_y

Camera lens vertical field of view in degrees

Type float in [0.00640536, 3.01675], default 0.0

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

clip_end

Camera far clipping distance

Type float in [1, inf], default 0.0

clip_start

Camera near clipping distance

Type float in [0.001, inf], default 0.0

dof_distance

Distance to the focus point for depth of field

Type float in [0, 5000], default 0.0

dof_object

Use this object to define the depth of field focal point

Type `Object`

draw_size

Apparent size of the Camera object in the 3D View

Type float in [0.01, 1000], default 0.0

lens

Perspective Camera lens value in millimeters

Type float in [1, 5000], default 0.0

lens_unit

Unit to edit lens in for the user interface

Type enum in ['MILLIMETERS', 'DEGREES'], default 'MILLIMETERS'

ortho_scale

Orthographic Camera scale (similar to zoom)

Type float in [0.01, 4000], default 0.0

passepout_alpha

Opacity (alpha) of the darkened overlay in Camera view

Type float in [0, 1], default 0.0

sensor_fit

Mode of calculating field of view from sensor dimensions and focal length

- AUTO** Auto, Calculate field of view using sensor size, with direction depending on image resolution.
- HORIZONTAL** Horizontal, Calculate field of view using sensor width.
- VERTICAL** Vertical, Calculate field of view using sensor height.

Type enum in ['AUTO', 'HORIZONTAL', 'VERTICAL'], default 'AUTO'

sensor_height

Vertical size of the image sensor area in millimeters

Type float in [1, inf], default 0.0

sensor_width

Horizontal size of the image sensor area in millimeters

Type float in [1, inf], default 0.0

shift_x

Perspective Camera horizontal shift

Type float in [-10, 10], default 0.0

shift_y

Perspective Camera vertical shift

Type float in [-10, 10], default 0.0

show_guide

Draw overlay

Type enum set in {'CENTER', 'CENTER_DIAGONAL', 'THIRDS', 'GOLDEN', 'GOLDEN_TRIANGLE_A', 'GOLDEN_TRIANGLE_B', 'HARMONY_TRIANGLE_A', 'HARMONY_TRIANGLE_B'}, default {'CENTER'}

show_limits

Draw the clipping range and focus point on the camera

Type boolean, default False

show_mist

Draw a line from the Camera to indicate the mist area

Type boolean, default False

show_name

Show the active Camera's name in Camera view

Type boolean, default False

show_passepout

Show a darkened overlay outside the image area in Camera view

Type boolean, default False

show_sensor

Show sensor size (film gate) in Camera view

Type boolean, default False

show_title_safe

Show indicators for the title safe zone in Camera view

Type boolean, default False

type

Camera types

Type enum in ['PERSP', 'ORTHO'], default 'PERSP'

use_panorama

Render the scene with a cylindrical camera for pseudo-fisheye lens effects

Type boolean, default False

view_frame (*scene=None*)

Return 4 points for the cameras frame (before object transformation)

Parameters **scene** (*Scene*, (optional)) – Scene to use for aspect calculation, when omitted 1:1 aspect is used

Return (**result_1, result_2, result_3, result_4**) *result_1*, Result, float array of 3 items in [-inf, inf]

result_2, Result, float array of 3 items in [-inf, inf]

result_3, Result, float array of 3 items in [-inf, inf]

result_4, Result, float array of 3 items in [-inf, inf]

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.cameras`
- `BlendDataCameras.new`
- `BlendDataCameras.remove`

2.4.83 CameraActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.CameraActuator` (*Actuator*)

axis

Axis the Camera will try to get behind

- X X, Camera tries to get behind the X axis.
- Y Y, Camera tries to get behind the Y axis.

Type enum in ['X', 'Y'], default 'X'

damping

Strength of the constraint that drives the camera behind the target

Type float in [0, 10], default 0.0

height

Type float in [-inf, inf], default 0.0

max

Type float in [-inf, inf], default 0.0

min

Type float in [-inf, inf], default 0.0

object

Look at this Object

Type `Object`

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`

- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.84 CameraSolverConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.CameraSolverConstraint` (*Constraint*)

Locks motion to the reconstructed camera movement

clip

Movie Clip to get tracking data from

Type `MovieClip`

use_active_clip

Use active clip defined in scene

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`

- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.85 CastModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.CastModifier` (*Modifier*)

Cast modifier to cast to other shapes

cast_type

Target object shape

Type enum in ['SPHERE', 'CYLINDER', 'CUBOID'], default 'SPHERE'

factor

Type float in [-inf, inf], default 0.0

object

Control object: if available, its location determines the center of the effect

Type `Object`

radius

Only deform vertices within this distance from the center of the effect (leave as 0 for infinite.)

Type float in [0, inf], default 0.0

size

Size of projection shape (leave as 0 for auto.)

Type float in [0, inf], default 0.0

use_radius_as_size

Use radius as size of projection shape (0 = auto)

Type boolean, default False

use_transform

Use object transform to control projection shape

Type boolean, default False

use_x

Type boolean, default False

use_y

Type boolean, default False

use_z

Type boolean, default False

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.86 ChannelDriverVariables(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ChannelDriverVariables` (*bpy_struct*)

Collection of channel driver Variables

new ()

Add a new variable for the driver

Returns Newly created Driver Variable

Return type `DriverVariable`

remove (*variable*)

Remove an existing variable from the driver

Parameters **variable** (`DriverVariable`, (never None)) – Variable to remove from the driver

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Driver.variables`

2.4.87 ChildOfConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.ChildOfConstraint` (*Constraint*)

Creates constraint-based parent-child relationship

inverse_matrix

Transformation matrix to apply before

Type float array of 16 items in $[-inf, inf]$, default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

subtarget

Type string, default ""

target

Target Object

Type Object

use_location_x

Use X Location of Parent

Type boolean, default False

use_location_y

Use Y Location of Parent

Type boolean, default False

use_location_z

Use Z Location of Parent

Type boolean, default False

use_rotation_x

Use X Rotation of Parent

Type boolean, default False

use_rotation_y

Use Y Rotation of Parent

Type boolean, default False

use_rotation_z

Use Z Rotation of Parent

Type boolean, default False

use_scale_x

Use X Scale of Parent

Type boolean, default False

use_scale_y

Use Y Scale of Parent

Type boolean, default False

use_scale_z

Use Z Scale of Parent

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`

- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.88 ChildParticle(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ChildParticle` (*bpy_struct*)
 Child particle interpolated from simulated or edited particles

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSystem.child_particles`

2.4.89 ClampToConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.ClampToConstraint` (*Constraint*)

Constrains an object's location to the nearest point along the target path

main_axis

Main axis of movement

Type enum in ['CLAMPTO_AUTO', 'CLAMPTO_X', 'CLAMPTO_Y', 'CLAMPTO_Z'], default 'CLAMPTO_AUTO'

target

Target Object

Type `Object`

use_cyclic

Treat curve as cyclic curve (no clamping to curve bounding box)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.90 ClothCollisionSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ClothCollisionSettings` (*`bpy_struct`*)

Cloth simulation settings for self collision and collision with other objects

collision_quality

How many collision iterations should be done. (higher is better quality but slower)

Type `int` in [1, 20], default 0

distance_min

Minimum distance between collision objects before collision response takes in

Type `float` in [0.001, 1], default 0.0

distance_repel

Maximum distance to apply repulsion force, must be greater than minimum distance

Type `float` in [0.001, 10], default 0.005

friction

Friction force if a collision happened (higher = less movement)

Type `float` in [0, 80], default 0.0

group

Limit colliders to this Group

Type `Group`

repel_force

Repulsion force to apply on cloth when close to colliding

Type `float` in [0, 20], default 1.0

self_collision_quality

How many self collision iterations should be done (higher is better quality but slower)

Type `int` in [1, 10], default 0

self_distance_min

0.5 means no distance at all, 1.0 is maximum distance

Type `float` in [0.5, 1], default 0.0

self_friction

Friction/damping with self contact

Type float in [0, 80], default 0.0

use_collision

Enable collisions with other objects

Type boolean, default False

use_self_collision

Enable self collisions

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ClothModifier.collision_settings`

2.4.91 ClothModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ClothModifier` (*Modifier*)

Cloth simulation modifier

collision_settings

Type `ClothCollisionSettings`, (readonly, never None)

point_cache

Type `PointCache`, (readonly, never None)

settings

Type `ClothSettings`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSystem.cloth`

2.4.92 ClothSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ClothSettings` (*bpy_struct*)
Cloth simulation settings for an object

air_damping

Air has normally some thickness which slows falling things down

Type float in [0, 10], default 0.0

bending_stiffness

Wrinkle coefficient (higher = less smaller but more big wrinkles)

Type float in [0, 10000], default 0.0

bending_stiffness_max

Maximum bending stiffness value

Type float in [0, 10000], default 0.0

collider_friction

Type float in [0, 1], default 0.0

effector_weights

Type `EffectorWeights`, (readonly)

goal_default

Default Goal (vertex target position) value, when no Vertex Group used

Type float in [0, 1], default 0.0

goal_friction

Goal (vertex target position) friction

Type float in [0, 50], default 0.0

goal_max

Goal maximum, vertex group weights are scaled to match this range

Type float in [0, 1], default 0.0

goal_min

Goal minimum, vertex group weights are scaled to match this range

Type float in [0, 1], default 0.0

goal_spring

Goal (vertex target position) spring stiffness

Type float in [0, 0.999], default 0.0

gravity

Gravity or external force vector

Type float array of 3 items in [-100, 100], default (0.0, 0.0, 0.0)

internal_friction

Type float in [0, 1], default 0.0

mass

Mass of cloth material

Type float in [0, 10], default 0.0

pin_stiffness

Pin (vertex target position) spring stiffness

Type float in [0, 50], default 0.0

pre_roll

Simulation starts on this frame

Type int in [0, 200], default 0

quality

Quality of the simulation in steps per frame (higher is better quality but slower)

Type int in [4, 80], default 0

rest_shape_key

Shape key to use the rest spring lengths from

Type `ShapeKey`

spring_damping

Damping of cloth velocity (higher = more smooth, less jiggling)

Type float in [0, 50], default 0.0

structural_stiffness

Overall stiffness of structure

Type float in [0, 10000], default 0.0

structural_stiffness_max

Maximum structural stiffness value

Type float in [0, 10000], default 0.0

use_pin_cloth

Enable pinning of cloth vertices to other objects/positions

Type boolean, default False

use_stiffness_scale

If enabled, stiffness can be scaled along a weight painted vertex group

Type boolean, default False

vertex_group_bending

Vertex group for fine control over bending stiffness

Type string, default ""

vertex_group_mass

Vertex Group for pinning of vertices

Type string, default ""

vertex_group_structural_stiffness

Vertex group for fine control over structural stiffness

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ClothModifier.settings`

2.4.93 CloudsTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.CloudsTexture` (*Texture*)

Procedural noise texture

cloud_type

Determines whether Noise returns grayscale or RGB values

Type enum in ['GREYSCALE', 'COLOR'], default 'GREYSCALE'

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_basis

Sets the noise basis used for turbulence

- `BLENDER_ORIGINAL` Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- `ORIGINAL_PERLIN` Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- `IMPROVED_PERLIN` Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- `VORONOI_F1` Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- `VORONOI_F2` Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- `VORONOI_F3` Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- `VORONOI_F4` Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- `VORONOI_F2_F1` Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- `VORONOI_CRACKLE` Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- `CELL_NOISE` Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4',

‘VORONOI_F2_F1’, ‘VORONOI_CRACKLE’, ‘CELL_NOISE’], default
‘BLENDER_ORIGINAL’

noise_depth

Sets the depth of the cloud calculation

Type int in [0, 30], default 0

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

noise_type

- SOFT_NOISE Soft, Generate soft noise (smooth transitions).
- HARD_NOISE Hard, Generate hard noise (sharp transitions).

Type enum in [‘SOFT_NOISE’, ‘HARD_NOISE’], default ‘SOFT_NOISE’

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- Texture.animation_data
- Texture.intensity
- Texture.color_ramp
- Texture.contrast
- Texture.factor_blue
- Texture.factor_green
- Texture.factor_red
- Texture.node_tree
- Texture.saturation
- Texture.use_preview_alpha
- Texture.type
- Texture.use_color_ramp
- Texture.use_nodes
- Texture.users_material
- Texture.users_object_modifier
- Texture.users_material
- Texture.users_object_modifier

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.94 CollectionProperty(Property)

base classes — `bpy_struct`, `Property`

class `bpy.types.CollectionProperty` (*Property*)
RNA collection property to define lists, arrays and mappings

fixed_type

Fixed pointer type, empty if variable type

Type `Struct`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`

- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.95 CollisionModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.CollisionModifier` (*Modifier*)

Collision modifier defining modifier stack position used for collision

settings

Type `CollisionSettings`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.96 CollisionSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.CollisionSensor` (*Sensor*)

Sensor to detect objects colliding with the current object, with more settings than the Touch sensor

material

Only look for Objects with this material (blank = all objects)

Type string, default ""

property

Only look for Objects with this property (blank = all objects)

Type string, default ""

use_material

Toggle collision on material or property

Type boolean, default False

use_pulse

Changes to the set of colliding objects generates pulse

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.97 CollisionSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.CollisionSettings` (*bpy_struct*)
Collision settings for object in physics simulation

absorption

How much of effector force gets lost during collision with this object (in percent)

Type float in [0, 1], default 0.0

damping

Amount of damping during collision

Type float in [0, 1], default 0.0

damping_factor

Amount of damping during particle collision

Type float in [0, 1], default 0.0

damping_random

Random variation of damping

Type float in [0, 1], default 0.0

friction_factor

Amount of friction during particle collision

Type float in [0, 1], default 0.0

friction_random

Random variation of friction

Type float in [0, 1], default 0.0

permeability

Chance that the particle will pass through the mesh

Type float in [0, 1], default 0.0

stickness

Amount of stickness to surface collision

Type float in [0, 10], default 0.0

thickness_inner

Inner face thickness

Type float in [0.001, 1], default 0.0

thickness_outer

Outer face thickness

Type float in [0.001, 1], default 0.0

use

Enable this objects as a collider for physics systems

Type boolean, default False

use_particle_kill

Kill collided particles

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `CollisionModifier.settings`
- `Object.collision`

2.4.98 ColorMapping(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ColorMapping` (*bpy_struct*)

Color mapping settings

blend_color

Blend color to mix with texture output color

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

blend_factor

Type float in [-inf, inf], default 0.0

blend_type

Mode used to mix with texture output color

Type enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIFFERENCE', 'DIVIDE', 'DARKEN', 'LIGHTEN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

brightness

Adjust the brightness of the texture

Type float in [0, 2], default 0.0

color_ramp

Type `ColorRamp`, (readonly)

contrast

Adjust the contrast of the texture

Type float in [0.01, 5], default 0.0

saturation

Adjust the saturation of colors in the texture

Type float in [0, 2], default 0.0

use_color_ramp

Toggle color ramp operations

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ShaderNodeTexEnvironment.color_mapping`
- `ShaderNodeTexGradient.color_mapping`
- `ShaderNodeTexImage.color_mapping`
- `ShaderNodeTexMagic.color_mapping`
- `ShaderNodeTexMusgrave.color_mapping`
- `ShaderNodeTexNoise.color_mapping`
- `ShaderNodeTexSky.color_mapping`
- `ShaderNodeTexVoronoi.color_mapping`
- `ShaderNodeTexWave.color_mapping`

2.4.99 ColorRamp(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ColorRamp` (*bpy_struct*)
Color ramp mapping a scalar value to a color

elements

Type `ColorRampElements` `bpy_prop_collection` of `ColorRampElement`, (read-only)

interpolation

Type enum in ['EASE', 'CARDINAL', 'LINEAR', 'B_SPLINE', 'CONSTANT'], default 'LINEAR'

evaluate (*position*)

Evaluate `ColorRamp`

Parameters `position` (*float in [0, 1]*) – Position, Evaluate `ColorRamp` at position

Returns Color, Color at given position

Return type float array of 4 items in [-inf, inf]

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ColorMapping.color_ramp`
- `CompositorNodeValToRGB.color_ramp`
- `DynamicPaintBrushSettings.paint_ramp`
- `DynamicPaintBrushSettings.velocity_ramp`
- `Material.diffuse_ramp`
- `Material.specular_ramp`
- `PointDensity.color_ramp`
- `ShaderNodeValToRGB.color_ramp`
- `Texture.color_ramp`
- `TextureNodeValToRGB.color_ramp`
- `UserPreferencesSystem.weight_color_range`

2.4.100 ColorRampElement(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ColorRampElement` (*bpy_struct*)
Element defining a color at a position in the color ramp

color

Set color of selected color stop

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

position

Set position of selected color stop

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ColorRamp.elements`
- `ColorRampElements.new`
- `ColorRampElements.remove`

2.4.101 ColorRampElements(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ColorRampElements` (*bpy_struct*)
Collection of Color Ramp Elements

new (*position*)

Add element to ColorRamp

Parameters *position* (*float in [0, 1]*) – Position, Position to add element

Returns New element

Return type `ColorRampElement`

remove (*element*)

Delete element from ColorRamp

Parameters *element* (`ColorRampElement`, (never None)) – Element to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ColorRamp.elements`

2.4.102 ColorSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

class `bpy.types.ColorSequence` (*EffectSequence*)
Sequence strip creating an image filled with a single g

color

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`

- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`
- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`
- `EffectSequence.strobe`
- `EffectSequence.transform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.103 CompositorNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `CompositorNodeSepHSVA`, `CompositorNodeValToRGB`, `CompositorNodeSepYCCA`,
`CompositorNodeBilateralblur`, `CompositorNodeSetAlpha`, `CompositorNodeCrop`,
`CompositorNodeMath`, `CompositorNodeCurveRGB`, `CompositorNodeDilateErode`,
`CompositorNodeGamma`, `CompositorNodeRotate`, `CompositorNodeLensdist`,

```

CompositorNodeMovieClip,    CompositorNodeLumaMatte,    CompositorNodeTranslate,
CompositorNodeCombYCCA,    CompositorNodeZcombine,    CompositorNodeFilter,
CompositorNodePremulKey,    CompositorNodeMixRGB,      CompositorNodeTime,
CompositorNodeValue,    CompositorNodeMovieDistortion,    CompositorNodeHueCorrect,
CompositorNodeNormal,    CompositorNodeIDMask,      CompositorNodeVecBlur,
CompositorNodeRLayers,    CompositorNodeComposite,    CompositorNodeCombRGBA,
CompositorNodeViewer,    CompositorNodeCombHSVA,    CompositorNodeOutputFile,
CompositorNodeInvert,    CompositorNodeFlip,        CompositorNodeDistanceMatte,
CompositorNodeRGBToBW,    CompositorNodeCombYUVA,    CompositorNodeStabilize,
CompositorNodeBlur,    CompositorNodeDefocus,      CompositorNodeGlare,
CompositorNodeTransform,    CompositorNodeDiffMatte,    CompositorNodeImage,
CompositorNodeDBLur,    CompositorNodeMapValue,    CompositorNodeBrightContrast,
CompositorNodeTexture,    CompositorNodeLevels,      CompositorNodeNormalize,
CompositorNodeChannelMatte,    CompositorNodeRGB,        CompositorNodeColorSpill,
CompositorNodeSepRGBA,    CompositorNodeScale,      CompositorNodeMapUV,
CompositorNodeChromaMatte,    CompositorNodeDisplace,    CompositorNodeColorBalance,
CompositorNodeTonemap,    CompositorNodeAlphaOver,    CompositorNodeColorMatte,
CompositorNodeHueSat,    CompositorNodeSepYUVA,      CompositorNodeCurveVec,
CompositorNodeSplitViewer

```

class `bpy.types.CompositorNode` (*Node*)

type

Type enum in ['VIEWER', 'RGB', 'VALUE', 'MIX_RGB', 'VALTORGB', 'RGBTOBW', 'NORMAL', 'CURVE_VEC', 'CURVE_RGB', 'ALPHAOVER', 'BLUR', 'FILTER', 'MAP_VALUE', 'TIME', 'VECBLUR', 'SEPRGBA', 'SEPHSVA', 'SE-TALPHA', 'HUE_SAT', 'IMAGE', 'R_LAYERS', 'COMPOSITE', 'OUTPUT_FILE', 'TEXTURE', 'TRANSLATE', 'ZCOMBINE', 'COMBRGBA', 'DILATEERODE', 'ROTATE', 'SCALE', 'SEPYCCA', 'COMBYCCA', 'SEPYUVA', 'COMBYUVA', 'DIFF_MATTE', 'COLOR_SPILL', 'CHROMA_MATTE', 'CHANNEL_MATTE', 'FLIP', 'SPLITVIEWER', 'MAP_UV', 'ID_MASK', 'DEFOCUS', 'DISPLACE', 'COMBHSVA', 'MATH', 'LUMA_MATTE', 'BRIGHTCONTRAST', 'GAMMA', 'INVERT', 'NORMALIZE', 'CROP', 'DBLUR', 'BILATERALBLUR', 'PREMULKEY', 'DISTANCE_MATTE', 'LEVELS', 'COLOR_MATTE', 'COLORBALANCE', 'HUECORRECT', 'MOVIECLIP', 'STABILIZE2D', 'TRANSFORM', 'MOVIEDISTORTION', 'GLARE', 'TONEMAP', 'LENSDIST', 'SCRIPT', 'GROUP'], default 'VIEWER', (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.104 CompositorNodeAlphaOver(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeAlphaOver` (*CompositorNode*)

premul

Mix Factor

Type float in [0, 1], default 0.0

use_premultiply

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.105 CompositorNodeBilateralblur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeBilateralblur` (*CompositorNode*)

iterations

Type `int` in [1, 128], default 0

sigma_color

Type `float` in [0.01, 3], default 0.0

sigma_space

Type `float` in [0.01, 30], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.106 CompositorNodeBlur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeBlur` (*CompositorNode*)

aspect_correction

Type of aspect correction to use

Type enum in ['NONE', 'Y', 'X'], default 'NONE'

factor

Type float in [0, 2], default 0.0

factor_x

Type float in [0, 100], default 0.0

factor_y

Type float in [0, 100], default 0.0

filter_type

Type enum in ['FLAT', 'TENT', 'QUAD', 'CUBIC', 'GAUSS', 'FAST_GAUSS', 'CATROM', 'MITCH'], default 'FLAT'

size_x

Type int in [0, 2048], default 0

size_y

Type int in [0, 2048], default 0

use_bokeh

Uses circular filter (slower)

Type boolean, default False

use_gamma_correction

Applies filter on gamma corrected values

Type boolean, default False

use_relative

Use relative (percent) values to define blur radius

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`

- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.107 CompositorNodeBrightContrast(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeBrightContrast` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.108 CompositorNodeChannelMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeChannelMatte` (*CompositorNode*)

color_space

- RGB RGB, RGB Color Space.
- HSV HSV, HSV Color Space.
- YUV YUV, YUV Color Space.
- YCC YCbCr, YCbCr Color Space.

Type enum in ['RGB', 'HSV', 'YUV', 'YCC'], default 'RGB'

limit_channel

Limit by this channels value

Type enum in ['R', 'G', 'B'], default 'R'

limit_max

Values higher than this setting are 100% opaque

Type float in [0, 1], default 0.0

limit_method

Algorithm to use to limit channel

- SINGLE Single, Limit by single channel.
- MAX Max, Limit by max of other channels .

Type enum in ['SINGLE', 'MAX'], default 'SINGLE'

limit_min

Values lower than this setting are 100% keyed

Type float in [0, 1], default 0.0

matte_channel

Channel used to determine matte

Type enum in ['R', 'G', 'B'], default 'R'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.109 CompositorNodeChromaMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeChromaMatte` (*CompositorNode*)

gain

Alpha gain

Type float in [0, 1], default 0.0

lift

Alpha lift

Type float in [0, 1], default 0.0

shadow_adjust

Adjusts the brightness of any shadows captured

Type float in [0, 1], default 0.0

threshold

Tolerance below which colors will be considered as exact matches

Type float in [0, 0.523599], default 0.0

tolerance

Tolerance for a color to be considered a keying color

Type float in [0.0174533, 1.39626], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.110 CompositorNodeColorBalance(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeColorBalance` (*CompositorNode*)

correction_method

- `LIFT_GAMMA_GAIN` Lift/Gamma/Gain.
- `OFFSET_POWER_SLOPE` Offset/Power/Slope (ASC-CDL), ASC-CDL standard color correction.

Type enum in ['LIFT_GAMMA_GAIN', 'OFFSET_POWER_SLOPE'], default 'LIFT_GAMMA_GAIN'

- gain**
Correction for Highlights
Type float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)
- gamma**
Correction for Midtones
Type float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)
- lift**
Correction for Shadows
Type float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)
- offset**
Correction for Shadows
Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)
- power**
Correction for Midtones
Type float array of 3 items in [0, inf], default (1.0, 1.0, 1.0)
- slope**
Correction for Highlights
Type float array of 3 items in [0, inf], default (1.0, 1.0, 1.0)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.111 CompositorNodeColorMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeColorMatte` (*CompositorNode*)

color_hue

Hue tolerance for colors to be considered a keying color

Type float in [0, 1], default 0.0

color_saturation

Saturation Tolerance for the color

Type float in [0, 1], default 0.0

color_value

Value Tolerance for the color

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.112 CompositorNodeColorSpill(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeColorSpill` (*CompositorNode*)

channel

- R R, Red Spill Suppression.
- G G, Green Spill Suppression.
- B B, Blue Spill Suppression.

Type enum in ['R', 'G', 'B'], default 'R'

limit_channel

- R R, Limit by Red.
- G G, Limit by Green.
- B B, Limit by Blue.

Type enum in ['R', 'G', 'B'], default 'R'

limit_method

- SIMPLE Simple, Simple Limit Algorithm.
- AVERAGE Average, Average Limit Algorithm.

Type enum in ['SIMPLE', 'AVERAGE'], default 'SIMPLE'

ratio

Scale limit by value

Type float in [0.5, 1.5], default 0.0

unspill_blue

Blue spillmap scale

Type float in [0, 1.5], default 0.0

unspill_green

Green spillmap scale

Type float in [0, 1.5], default 0.0

unspill_red

Red spillmap scale

Type float in [0, 1.5], default 0.0

use_unspill

Compensate all channels (differently) by hand

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.113 CompositorNodeCombHSVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCombHSVA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.114 CompositorNodeCombRGBA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCombRGBA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.115 CompositorNodeCombYCCA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCombYCCA` (*CompositorNode*)

mode

Type enum in ['ITUBT601', 'ITUBT709', 'JFIF'], default 'ITUBT601'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.116 CompositorNodeCombYUVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCombYUVA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.117 CompositorNodeComposite(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeComposite` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.118 CompositorNodeCrop(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCrop` (*CompositorNode*)

max_x
 Type int in [0, 10000], default 0

max_y
 Type int in [0, 10000], default 0

min_x
 Type int in [0, 10000], default 0

min_y
 Type int in [0, 10000], default 0

rel_max_x
 Type float in [0, 1], default 0.0

rel_max_y
 Type float in [0, 1], default 0.0

rel_min_x
 Type float in [0, 1], default 0.0

rel_min_y
 Type float in [0, 1], default 0.0

relative
 Use relative values to crop image
 Type boolean, default False

use_crop_size

Whether to crop the size of the input image

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.119 CompositorNodeCurveRGB(CompositorNode)base classes — `bpy_struct`, `Node`, `CompositorNode`**class** `bpy.types.CompositorNodeCurveRGB` (*CompositorNode*)**mapping****Type** `CurveMapping`, (readonly)**Inherited Properties**

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`

- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.120 CompositorNodeCurveVec(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCurveVec` (*CompositorNode*)

mapping

Type `CurveMapping`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.121 CompositorNodeDBlur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeDBlur` (*CompositorNode*)

angle

Type float in [0, 6.28319], default 0.0

center_x

Type float in [0, 1], default 0.0

center_y

Type float in [0, 1], default 0.0

distance

Type float in [-1, 1], default 0.0

iterations

Type int in [1, 32], default 0

spin

Type float in [-6.28319, 6.28319], default 0.0

use_wrap

Type boolean, default False

zoom

Type float in [0, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`

- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.122 CompositorNodeDefocus(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeDefocus` (*CompositorNode*)

angle

Bokeh shape rotation offset in degrees

Type float in [0, 1.5708], default 0.0

blur_max

blur limit, maximum CoC radius, 0=no limit

Type float in [0, 10000], default 0.0

bokeh

- **OCTAGON** Octagonal, 8 sides.
- **HEPTAGON** Heptagonal, 7 sides.
- **HEXAGON** Hexagonal, 6 sides.
- **PENTAGON** Pentagonal, 5 sides.
- **SQUARE** Square, 4 sides.
- **TRIANGLE** Triangular, 3 sides.
- **CIRCLE** Circular.

Type enum in ['OCTAGON', 'HEPTAGON', 'HEXAGON', 'PENTAGON', 'SQUARE', 'TRIANGLE', 'CIRCLE'], default 'CIRCLE'

f_stop

Amount of focal blur, 128=infinity=perfect focus, half the value doubles the blur radius

Type float in [0, 128], default 0.0

samples

Number of samples (16=grainy, higher=less noise)

Type int in [16, 256], default 0

threshold

CoC radius threshold, prevents background bleed on in-focus midground, 0=off

Type float in [0, 100], default 0.0

use_gamma_correction

Enable gamma correction before and after main process

Type boolean, default False

use_preview

Enable sampling mode, useful for preview when using low samplecounts

Type boolean, default False

use_zbuffer

Disable when using an image as input instead of actual z-buffer (auto enabled if node not image based, eg. time node)

Type boolean, default False

z_scale

Scales the Z input when not using a z-buffer, controls maximum blur designated by the color white or input value 1

Type float in [0, 1000], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.123 CompositorNodeDiffMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeDiffMatte` (*CompositorNode*)

falloff

Color distances below this additional threshold are partially keyed

Type float in [0, 1], default 0.0

tolerance

Color distances below this threshold are keyed

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.124 CompositorNodeDilateErode(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeDilateErode` (*CompositorNode*)

distance

Distance to grow/shrink (number of iterations)

Type `int` in `[-100, 100]`, default `0`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.125 CompositorNodeDisplace(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

`class bpy.types.CompositorNodeDisplace` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.126 CompositorNodeDistanceMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

`class bpy.types.CompositorNodeDistanceMatte` (*CompositorNode*)

falloff

Color distances below this additional threshold are partially keyed

Type float in [0, 1], default 0.0

tolerance

Color distances below this threshold are keyed

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`

- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.127 CompositorNodeFilter(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeFilter` (*CompositorNode*)

filter_type

Type enum in ['SOFTEN', 'SHARPEN', 'LAPLACE', 'SOBEL', 'PREWITT', 'KIRSCH', 'SHADOW'], default 'SOFTEN'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.128 CompositorNodeFlip(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeFlip` (*CompositorNode*)

axis

Type enum in ['X', 'Y', 'XY'], default 'X'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.129 CompositorNodeGamma(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeGamma` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.130 CompositorNodeGlare(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeGlare` (*CompositorNode*)

angle_offset

Streak angle offset

Type float in [0, 3.14159], default 0.0

color_modulation

Amount of Color Modulation, modulates colors of streaks and ghosts for a spectral dispersion effect

Type float in [0, 1], default 0.0

fade

Streak fade-out factor

Type float in [0.75, 1], default 0.0

glare_type

Type enum in ['GHOSTS', 'STREAKS', 'FOG_GLOW', 'SIMPLE_STAR'], default 'SIMPLE_STAR'

iterations

Type int in [2, 5], default 0

mix

-1 is original image only, 0 is exact 50/50 mix, 1 is processed image only

Type float in [-1, 1], default 0.0

quality

If not set to high quality, the effect will be applied to a low-res copy of the source image

Type enum in ['HIGH', 'MEDIUM', 'LOW'], default 'HIGH'

size

Glow/glare size (not actual size; relative to initial size of bright area of pixels)

Type int in [6, 9], default 0

streaks

Total number of streaks

Type int in [2, 16], default 0

threshold

The glare filter will only be applied to pixels brighter than this value

Type float in [0, 1000], default 0.0

use_rotate_45

Simple star filter: add 45 degree rotation offset

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`

- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.131 CompositorNodeHueCorrect(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeHueCorrect` (*CompositorNode*)

mapping

Type `CurveMapping`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.132 CompositorNodeHueSat(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeHueSat` (*CompositorNode*)

color_hue

Type float in [0, 1], default 0.0

color_saturation

Type float in [0, 2], default 0.0

color_value

Type float in [0, 2], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.133 CompositorNodeIDMask(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeIDMask` (*CompositorNode*)

index

Pass index number to convert to alpha

Type int in [0, 32767], default 0

use_smooth_mask

Apply an anti-aliasing filter to the mask

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.134 CompositorNodeImage(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeImage` (*CompositorNode*)

frame_duration

Number of images of a movie to use

Type int in [0, 300000], default 0

frame_offset

Offset the number of the frame to use in the animation

Type int in [-300000, 300000], default 0

frame_start

Global starting frame of the movie/sequence, assuming first picture has a #1

Type int in [-300000, 300000], default 0

image

Type `Image`

layer

Type enum in ['PLACEHOLDER'], default 'PLACEHOLDER'

use_auto_refresh

Always refresh image on frame changes

Type boolean, default False

use_cyclic

Cycle the images in the movie

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.135 CompositorNodeInvert(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeInvert` (*CompositorNode*)

invert_alpha

Type boolean, default False

invert_rgb

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.136 CompositorNodeLensdist(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeLensdist` (*CompositorNode*)

use_fit

For positive distortion factor only: scale image such that black areas are not visible

Type boolean, default False

use_jitter

Enable/disable jittering; faster, but also noisier

Type boolean, default False

use_projector

Enable/disable projector mode. Effect is applied in horizontal direction only

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.137 CompositorNodeLevels(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeLevels` (*CompositorNode*)

channel

- `COMBINED_RGB` C, Combined RGB.
- `RED` R, Red Channel.
- `GREEN` G, Green Channel.
- `BLUE` B, Blue Channel.
- `LUMINANCE` L, Luminance Channel.

Type enum in ['COMBINED_RGB', 'RED', 'GREEN', 'BLUE', 'LUMINANCE'], default 'COMBINED_RGB'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.138 CompositorNodeLumaMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeLumaMatte` (*CompositorNode*)

limit_max

Values higher than this setting are 100% opaque

Type float in [0, 1], default 0.0

limit_min

Values lower than this setting are 100% keyed

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.139 CompositorNodeMapUV(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeMapUV` (*CompositorNode*)

alpha**Type** int in [0, 100], default 0**Inherited Properties**

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.140 CompositorNodeMapValue(CompositorNode)base classes — `bpy_struct`, `Node`, `CompositorNode`**class** `bpy.types.CompositorNodeMapValue` (*CompositorNode*)**max****Type** float array of 1 items in [-1000, 1000], default (0.0)**min****Type** float array of 1 items in [-1000, 1000], default (0.0)**offset****Type** float array of 1 items in [-1000, 1000], default (0.0)**size**

Type float array of 1 items in [-1000, 1000], default (0.0)

use_max

Type boolean, default False

use_min

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.141 CompositorNodeMath(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeMath` (*CompositorNode*)

operation

Type enum in ['ADD', 'SUBTRACT', 'MULTIPLY', 'DIVIDE', 'SINE', 'COSINE', 'TANGENT', 'ARCSINE', 'ARCCOSINE', 'ARCTANGENT', 'POWER', 'LOGARITHM', 'MINIMUM', 'MAXIMUM', 'ROUND', 'LESS_THAN', 'GREATER_THAN'], default 'ADD'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.142 CompositorNodeMixRGB(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeMixRGB` (*CompositorNode*)

blend_type

Type enum in ['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

use_alpha

Include alpha of second input in this operation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`

- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.143 CompositorNodeMovieClip(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeMovieClip` (*CompositorNode*)

clip

Type `MovieClip`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.144 CompositorNodeMovieDistortion(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeMovieDistortion` (*CompositorNode*)

clip

Type `MovieClip`

distortion_type

Distortion to use to filter image

Type `enum` in [`'UNDISTORT'`, `'DISTORT'`], default `'UNDISTORT'`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.145 CompositorNodeNormal(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeNormal` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.146 CompositorNodeNormalize(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeNormalize` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.147 CompositorNodeOutputFile(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeOutputFile` (*CompositorNode*)

exr_codec

Type enum in ['NONE', 'PXR24', 'ZIP', 'PIZ', 'RLE'], default 'NONE'

filepath

Output path for the image, same functionality as render output

Type string, default ""

frame_end

Type int in [0, 300000], default 0

frame_start

Type int in [0, 300000], default 0

image_type

Type enum in ['TARGA', 'RAW_TARGA', 'PNG', 'BMP', 'JPEG', 'IRIS', 'RADIANCE_HDR', 'CINEON', 'DPX', 'OPENEXR'], default 'TARGA'

quality

Type int in [1, 100], default 0

use_exr_half

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.148 CompositorNodePremulKey(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodePremulKey` (*CompositorNode*)

mapping

Conversion between premultiplied alpha and key alpha

Type enum in ['KEY_TO_PREMUL', 'PREMUL_TO_KEY'], default 'KEY_TO_PREMUL'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.149 CompositorNodeRGB(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeRGB` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`

- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.150 CompositorNodeRGBToBW(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeRGBToBW` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.151 CompositorNodeRLayers(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeRLayers` (*CompositorNode*)

layer

Type enum in ['PLACEHOLDER'], default 'PLACEHOLDER'

scene

Type Scene

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.152 CompositorNodeRotate(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeRotate` (*CompositorNode*)

filter_type

Method to use to filter rotation

Type enum in ['NEAREST', 'BILINEAR', 'BICUBIC'], default 'NEAREST'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.153 CompositorNodeScale(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeScale` (*CompositorNode*)

space

Coordinate space to scale relative to

Type enum in ['RELATIVE', 'ABSOLUTE', 'SCENE_SIZE', 'RENDER_SIZE'], default 'RELATIVE'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.154 CompositorNodeSepHSVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSepHSVA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.155 CompositorNodeSepRGBA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSepRGBA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.156 CompositorNodeSepYCCA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSepYCCA` (*CompositorNode*)

mode

Type enum in ['ITUBT601', 'ITUBT709', 'JFIF'], default 'ITUBT601'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.157 CompositorNodeSepYUVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSepYUVA` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.158 CompositorNodeSetAlpha(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSetAlpha` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.159 CompositorNodeSplitViewer(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSplitViewer` (*CompositorNode*)

axis

Type enum in ['X', 'Y'], default 'X'

factor

Type int in [0, 100], default 0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.160 CompositorNodeStabilize(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeStabilize` (*CompositorNode*)

clip

Type `MovieClip`

filter_type

Method to use to filter stabilization

Type `enum` in ['NEAREST', 'BILINEAR', 'BICUBIC'], default 'NEAREST'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.161 CompositorNodeTexture(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeTexture` (*CompositorNode*)

node_output

For node-based textures, which output node to use

Type `int` in `[-32768, 32767]`, default `0`

texture

Type `Texture`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.162 CompositorNodeTime(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeTime` (*CompositorNode*)

curve

Type `CurveMapping`, (readonly)

frame_end

Type `int` in `[-32768, 32767]`, default 0

frame_start

Type `int` in `[-32768, 32767]`, default 0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.163 CompositorNodeTonemap(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeTonemap` (*CompositorNode*)

adaptation

If 0, global; if 1, based on pixel intensity

Type float in [0, 1], default 0.0

contrast

Set to 0 to use estimate from input image

Type float in [0, 1], default 0.0

correction

If 0, same for all channels; if 1, each independent

Type float in [0, 1], default 0.0

gamma

If not used, set to 1

Type float in [0.001, 3], default 0.0

intensity

If less than zero, darkens image; otherwise, makes it brighter

Type float in [-8, 8], default 0.0

key

The value the average luminance is mapped to

Type float in [0, 1], default 0.0

offset

Normally always 1, but can be used as an extra control to alter the brightness curve

Type float in [0.001, 10], default 0.0

tonemap_type

Type enum in ['RD_PHOTORECEPTOR', 'RH_SIMPLE'], default 'RH_SIMPLE'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.164 CompositorNodeTransform(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeTransform` (*CompositorNode*)

filter_type

Method to use to filter transform

Type enum in ['NEAREST', 'BILINEAR', 'BICUBIC'], default 'NEAREST'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.165 CompositorNodeTranslate(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeTranslate` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.166 CompositorNodeTree(NodeTree)

base classes — `bpy_struct`, `ID`, `NodeTree`

class `bpy.types.CompositorNodeTree` (*NodeTree*)

Node tree consisting of linked nodes used for compositing

nodes

Type `CompositorNodes` `bpy_prop_collection` of `Node`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `NodeTree.animation_data`
- `NodeTree.grease_pencil`
- `NodeTree.inputs`
- `NodeTree.links`
- `NodeTree.outputs`
- `NodeTree.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.167 CompositorNodeValToRGB(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeValToRGB` (*CompositorNode*)

color_ramp

Type `ColorRamp`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.168 CompositorNodeValue(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeValue` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.169 CompositorNodeVecBlur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeVecBlur` (*CompositorNode*)

factor

Scaling factor for motion vectors; actually ‘shutter speed’ in frames

Type float in [0, 2], default 0.0

samples

Type int in [1, 256], default 0

speed_max

Maximum speed, or zero for none

Type int in [0, 1024], default 0

speed_min

Minimum speed for a pixel to be blurred; used to separate background from foreground

Type int in [0, 1024], default 0

use_curved

Interpolate between frames in a Bezier curve, rather than linearly

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`

- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.170 CompositorNodeViewer(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeViewer` (*CompositorNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.171 CompositorNodeZcombine(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeZcombine` (*CompositorNode*)

use_alpha

Takes Alpha channel into account when doing the Z operation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `CompositorNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.172 CompositorNodes(bpy_struct)

base class — `bpy_struct`

class `bpy.types.CompositorNodes` (*bpy_struct*)

Collection of Compositor Nodes

new (*type*, *group=None*)

Add a node to this node tree

Parameters

- **type** (*enum in* [`'VIEWER'`, `'RGB'`, `'VALUE'`, `'MIX_RGB'`, `'VALTORGB'`, `'RGBTOBW'`, `'NORMAL'`, `'CURVE_VEC'`, `'CURVE_RGB'`, `'ALPHAOVER'`, `'BLUR'`, `'FILTER'`, `'MAP_VALUE'`, `'TIME'`, `'VECBLUR'`, `'SEPRGBA'`, `'SEPHSVA'`, `'SE-TALPHA'`, `'HUE_SAT'`, `'IMAGE'`, `'R_LAYERS'`, `'COMPOSITE'`, `'OUTPUT_FILE'`, `'TEXTURE'`, `'TRANSLATE'`, `'ZCOMBINE'`, `'COMBRGBA'`, `'DILATEERODE'`, `'ROTATE'`, `'SCALE'`, `'SEPYCCA'`, `'COMBYCCA'`, `'SEPYUVA'`, `'COMBYUVA'`, `'DIFF_MATTE'`, `'COLOR_SPILL'`, `'CHROMA_MATTE'`, `'CHANNEL_MATTE'`, `'FLIP'`, `'SPLITVIEWER'`, `'MAP_UV'`, `'ID_MASK'`, `'DEFOCUS'`, `'DISPLACE'`, `'COMBHSVA'`, `'MATH'`, `'LUMA_MATTE'`, `'BRIGHTCONTRAST'`, `'GAMMA'`, `'INVERT'`, `'NORMALIZE'`, `'CROP'`, `'DBLUR'`, `'BILATERALBLUR'`, `'PREMULKEY'`, `'DISTANCE_MATTE'`, `'LEVELS'`, `'COLOR_MATTE'`, `'COLORBALANCE'`, `'HUECORRECT'`, `'MOVIECLIP'`, `'STABILIZE2D'`, `'TRANSFORM'`, `'MOVIEDISTORTION'`, `'GLARE'`, `'TONEMAP'`, `'LENSDIST'`, `'SCRIPT'`, `'GROUP'`]) – Type, Type of node to add
- **group** (`NodeTree`, (optional)) – The group tree

Returns New node

Return type `Node`

remove (*node*)

Remove a node from this node tree

Parameters **node** (`Node`) – The node to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `CompositorNodeTree.nodes`

2.4.173 ConsoleLine(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ConsoleLine` (*bpy_struct*)

Input line for the interactive console

body

Text in the line

Type string, default ""

current_character

Type int in [-inf, inf], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceConsole.history`
- `SpaceConsole.scrollback`

2.4.174 Constraint(`bpy_struct`)

base class — `bpy_struct`

subclasses — `KinematicConstraint`, `CopyScaleConstraint`, `ShrinkwrapConstraint`,
`FollowTrackConstraint`, `LimitDistanceConstraint`, `FollowPathConstraint`,
`LockedTrackConstraint`, `CopyTransformsConstraint`, `PythonConstraint`,
`StretchToConstraint`, `PivotConstraint`, `ClampToConstraint`, `TransformConstraint`,
`LimitRotationConstraint`, `CameraSolverConstraint`, `LimitLocationConstraint`,
`ChildOfConstraint`, `CopyRotationConstraint`, `DampedTrackConstraint`,
`TrackToConstraint`, `SplineIKConstraint`, `MaintainVolumeConstraint`,
`LimitScaleConstraint`, `RigidBodyJointConstraint`, `FloorConstraint`, `ActionConstraint`,
`CopyLocationConstraint`

class `bpy.types.Constraint` (*bpy_struct*)

Constraint modifying the transformation of objects and bones

active

Constraint is the one being edited

Type boolean, default False

error_location

Amount of residual error in Blender space unit for constraints that work on position

Type float in [-inf, inf], default 0.0, (readonly)

error_rotation

Amount of residual error in radiant for constraints that work on orientation

Type float in [-inf, inf], default 0.0, (readonly)

influence

Amount of influence constraint will have on the final solution

Type float in [0, 1], default 0.0

is_proxy_local

Constraint was added in this proxy instance (i.e. did not belong to source Armature)

Type boolean, default False

is_valid

Constraint has valid settings and can be evaluated

Type boolean, default False, (readonly)

mute

Enable/Disable Constraint

Type boolean, default False

name

Constraint name

Type string, default ""

owner_space

Space that owner is evaluated in

- **WORLD** World Space, The constraint is applied relative to the world coordinate system.
- **POSE** Pose Space, The constraint is applied in Pose Space, the object transformation is ignored.

- LOCAL_WITH_PARENT** Local With Parent, The constraint is applied relative to the local coordinate system of the object, with the parent transformation added.
- LOCAL** Local Space, The constraint is applied relative to the local coordinate system of the object.

Type enum in ['WORLD', 'POSE', 'LOCAL_WITH_PARENT', 'LOCAL'], default 'WORLD'

show_expanded

Constraint's panel is expanded in UI

Type boolean, default False

target_space

Space that target is evaluated in

- WORLD** World Space, The transformation of the target is evaluated relative to the world coordinate system.
- POSE** Pose Space, The transformation of the target is only evaluated in the Pose Space, the target armature object transformation is ignored.
- LOCAL_WITH_PARENT** Local With Parent, The transformation of the target bone is evaluated relative its local coordinate system, with the parent transformation added.
- LOCAL** Local Space, The transformation of the target is evaluated relative to its local coordinate system.

Type enum in ['WORLD', 'POSE', 'LOCAL_WITH_PARENT', 'LOCAL'], default 'WORLD'

type

- CAMERA_SOLVER** Camera Solver.
- FOLLOW_TRACK** Follow Track.
- COPY_LOCATION** Copy Location.
- COPY_ROTATION** Copy Rotation.
- COPY_SCALE** Copy Scale.
- COPY_TRANSFORMS** Copy Transforms.
- LIMIT_DISTANCE** Limit Distance.
- LIMIT_LOCATION** Limit Location.
- LIMIT_ROTATION** Limit Rotation.
- LIMIT_SCALE** Limit Scale.
- MAINTAIN_VOLUME** Maintain Volume.
- TRANSFORM** Transformation.
- CLAMP_TO** Clamp To.
- DAMPED_TRACK** Damped Track, Tracking by taking the shortest path.
- IK** Inverse Kinematics.
- LOCKED_TRACK** Locked Track, Tracking along a single axis.
- SPLINE_IK** Spline IK.

- STRETCH_TO Stretch To.
- TRACK_TO Track To, Legacy tracking constraint prone to twisting artifacts.
- ACTION Action.
- CHILD_OF Child Of.
- FLOOR Floor.
- FOLLOW_PATH Follow Path.
- PIVOT Pivot.
- RIGID_BODY_JOINT Rigid Body Joint.
- SCRIPT Script.
- SHRINKWRAP Shrinkwrap.

Type enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP'], default 'CAMERA_SOLVER', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.constraints`
- `ObjectConstraints.active`
- `ObjectConstraints.new`

- `ObjectConstraints.remove`
- `PoseBone.constraints`
- `PoseBoneConstraints.active`
- `PoseBoneConstraints.new`
- `PoseBoneConstraints.remove`
- `UILayout.template_constraint`

2.4.175 ConstraintActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ConstraintActuator` (*Actuator*)

Actuator to handle Constraints

angle_max

Maximum angle (in degree) allowed with target direction (no correction is done if angle with target direction is between min and max)

Type float in [0, 180], default 0.0

angle_min

Minimum angle (in degree) to maintain with target direction (no correction is done if angle with target direction is between min and max)

Type float in [0, 180], default 0.0

damping

Damping factor: time constant (in frame) of low pass filter

Type int in [-32768, 32767], default 0

damping_rotation

Use a different damping for orientation

Type int in [-32768, 32767], default 0

direction

Direction of the ray

Type enum in ['NONE', 'DIRPX', 'DIRPY', 'DIRPZ', 'DIRNX', 'DIRNY', 'DIRNZ'], default 'NONE'

direction_axis

Select the axis to be aligned along the reference direction

Type enum in ['NONE', 'DIRPX', 'DIRPY', 'DIRPZ', 'DIRNX', 'DIRNY', 'DIRNZ'], default 'NONE'

direction_axis_pos

Select the axis to be aligned along the reference direction

Type enum in ['NONE', 'DIRPX', 'DIRPY', 'DIRPZ'], default 'NONE'

distance

Keep this distance to target

Type float in [-inf, inf], default 0.0

fh_damping

Damping factor of the force field spring

Type float in [-inf, inf], default 0.0

fh_force

Spring force within the force field area

Type float in [-inf, inf], default 0.0

fh_height

Height of the force field area

Type float in [-inf, inf], default 0.0

limit

Type enum in ['NONE', 'LOCX', 'LOCY', 'LOCZ'], default 'NONE'

limit_max

Type float in [-inf, inf], default 0.0

limit_min

Type float in [-inf, inf], default 0.0

material

Ray detects only Objects with this material

Type string, default ""

mode

The type of the constraint

Type enum in ['LOC', 'DIST', 'ORI', 'FH'], default 'LOC'

property

Ray detects only Objects with this property

Type string, default ""

range

Maximum length of ray

Type float in [-inf, inf], default 0.0

rotation_max

Reference Direction

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

time

Maximum activation time in frame, 0 for unlimited

Type int in [-32768, 32767], default 0

use_fh_normal

Add a horizontal spring force on slopes

Type boolean, default False

use_fh_paralel_axis

Keep object axis parallel to normal

Type boolean, default False

use_force_distance

Force distance of object to point of impact of ray

Type boolean, default False

use_local

Set ray along object's axis or global axis

Type boolean, default False

use_material_detect

Detect material instead of property

Type boolean, default False

use_normal

Set object axis along (local axis) or parallel (global axis) to the normal at hit position

Type boolean, default False

use_persistent

Persistent actuator: stays active even if ray does not reach target

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.176 ConstraintTarget(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ConstraintTarget` (*bpy_struct*)

Target object for multi-target constraints

subtarget**Type** string, default ""**target**

Target Object

Type Object**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `PythonConstraint.targets`

2.4.177 Context(bpy_struct)base class — `bpy_struct`

class `bpy.types.Context` (*bpy_struct*)
Current windowmanager and data context

area**Type** `Area`, (readonly)**blend_data****Type** `BlendData`, (readonly)**mode**

Type enum in ['EDIT_MESH', 'EDIT_CURVE', 'EDIT_SURFACE', 'EDIT_TEXT', 'EDIT_ARMATURE', 'EDIT_METABALL', 'EDIT_LATTICE', 'POSE', 'SCULPT', 'PAINT_WEIGHT', 'PAINT_VERTEX', 'PAINT_TEXTURE', 'PARTICLE', 'OBJECT'], default 'EDIT_MESH', (readonly)

region

Type `Region`, (readonly)

region_data

Type `RegionView3D`, (readonly)

scene

Type `Scene`, (readonly)

screen

Type `Screen`, (readonly)

space_data

Type `Space`, (readonly)

tool_settings

Type `ToolSettings`, (readonly)

user_preferences

Type `UserPreferences`, (readonly)

window

Type `Window`, (readonly)

window_manager

Type `WindowManager`, (readonly)

static copy (*self*)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Header.draw`
- `KeyingSetInfo.generate`
- `KeyingSetInfo.iterator`
- `KeyingSetInfo.poll`
- `Macro.draw`
- `Macro.poll`
- `Menu.draw`
- `Menu.poll`
- `Operator.cancel`
- `Operator.check`
- `Operator.draw`
- `Operator.execute`
- `Operator.invoke`
- `Operator.modal`
- `Operator.poll`
- `Panel.draw`
- `Panel.draw_header`
- `Panel.poll`
- `RenderEngine.view_draw`
- `RenderEngine.view_update`

2.4.178 ControlFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.ControlFluidSettings` (*FluidSettings*)

Fluid simulation settings for objects controlling the motion of fluid in the simulation

attraction_radius

Specifies the force field radius around the control object

Type float in [0, 10], default 0.0

attraction_strength

Force strength for directional attraction towards the control object

Type float in [-10, 10], default 0.0

end_time

Specifies time when the control particles are deactivated

Type float in [0, 100], default 0.0

quality

Specifies the quality which is used for object sampling. (higher = better but slower)

Type float in [5, 100], default 0.0

start_time

Specifies time when the control particles are activated

Type float in [0, 100], default 0.0

use

Object contributes to the fluid simulation

Type boolean, default False

use_reverse_frames

Reverse control object movement

Type boolean, default False

velocity_radius

Specifies the force field radius around the control object

Type float in [0, 10], default 0.0

velocity_strength

Force strength of how much of the control object's velocity is influencing the fluid velocity

Type float in [0, 10], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.179 Controller(`bpy_struct`)

base class — `bpy_struct`

subclasses — `ExpressionController`, `XnorController`, `PythonController`, `AndController`, `NorController`, `OrController`, `XorController`, `NandController`

class `bpy.types.Controller` (*bpy_struct*)

Game engine logic brick to process events, connecting sensors to actuators

name

Type string, default ""

show_expanded

Set controller expanded in the user interface

Type boolean, default False

states

Set Controller state index (1 to 30)

Type int in [1, 30], default 0

type

- LOGIC_AND And, Logic And.
- LOGIC_OR Or, Logic Or.
- LOGIC_NAND Nand, Logic Nand.
- LOGIC_NOR Nor, Logic Nor.
- LOGIC_XOR Xor, Logic Xor.
- LOGIC_XNOR Xnor, Logic Xnor.
- EXPRESSION Expression.
- PYTHON Python.

Type enum in ['LOGIC_AND', 'LOGIC_OR', 'LOGIC_NAND', 'LOGIC_NOR', 'LOGIC_XOR', 'LOGIC_XNOR', 'EXPRESSION', 'PYTHON'], default 'LOGIC_AND'

use_priority

Mark controller for execution before all non-marked controllers (good for startup scripts)

Type boolean, default False

link (*sensor=None, actuator=None*)

Link the controller with a sensor/actuator

Parameters

- **sensor** (*Sensor*, (optional)) – Sensor to link the controller to
- **actuator** (*Actuator*, (optional)) – Actuator to link the controller to

unlink (*sensor=None, actuator=None*)

Unlink the controller from a sensor/actuator

Parameters

- **sensor** (*Sensor*, (optional)) – Sensor to unlink the controller from
- **actuator** (*Actuator*, (optional)) – Actuator to unlink the controller from

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Actuator.link`
- `Actuator.unlink`
- `GameObjectSettings.controllers`
- `Sensor.link`
- `Sensor.unlink`

2.4.180 CopyLocationConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.CopyLocationConstraint` (*Constraint*)
Copies the location of the target

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

invert_x

Invert the X location

Type boolean, default False

invert_y

Invert the Y location

Type boolean, default False

invert_z

Invert the Z location

Type boolean, default False

subtarget

Type string, default ""

target

Target Object

Type `Object`

use_offset

Add original location into copied location

Type boolean, default False

use_x

Copy the target's X location

Type boolean, default False

use_y

Copy the target's Y location

Type boolean, default False

use_z

Copy the target's Z location

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.181 CopyRotationConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.CopyRotationConstraint` (*Constraint*)

Copies the rotation of the target

invert_x

Invert the X rotation

Type boolean, default False

invert_y

Invert the Y rotation

Type boolean, default False

invert_z

Invert the Z rotation

Type boolean, default False

subtarget

Type string, default ""

target

Target Object

Type `Object`

use_offset

Add original rotation into copied rotation

Type boolean, default False

use_x

Copy the target's X rotation

Type boolean, default False

use_y

Copy the target's Y rotation

Type boolean, default False

use_z

Copy the target's Z rotation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`

- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.182 CopyScaleConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.CopyScaleConstraint` (*Constraint*)

Copies the scale of the target

subtarget

Type string, default ""

target

Target Object

Type Object

use_offset

Add original scale into copied scale

Type boolean, default False

use_x

Copy the target's X scale

Type boolean, default False

use_y

Copy the target's Y scale

Type boolean, default False

use_z

Copy the target's Z scale

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.183 CopyTransformsConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.CopyTransformsConstraint` (*Constraint*)
Copies all the transforms of the target

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

subtarget

Type string, default ""

target

Target Object

Type `Object`

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.184 Curve(ID)

base classes — `bpy_struct`, `ID`

subclasses — `SurfaceCurve`, `TextCurve`

class `bpy.types.Curve` (*ID*)

Curve datablock storing curves, splines and NURBS

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

bevel_depth

Bevel depth when not using a bevel object

Type float in `[-inf, inf]`, default 0.0

bevel_object

Curve object name that defines the bevel shape

Type `Object`

bevel_resolution

Bevel resolution when depth is non-zero and no specific bevel object has been defined

Type `int` in `[0, 32]`, default `0`

dimensions

Select 2D or 3D curve type

- 2D 2D, Clamp the Z axis of of the curve.
- 3D 3D, Allow editing on the Z axis of this curve, also allows tilt and curve radius to be used.

Type `enum` in `['2D', '3D']`, default `'2D'`

eval_time

Parametric position along the length of the curve that Objects 'following' it should be at. Position is evaluated by dividing by the 'Path Length' value

Type `float` in `[-inf, inf]`, default `0.0`

extrude

Amount of curve extrusion when not using a bevel object

Type `float` in `[0, inf]`, default `0.0`

fill_mode

Mode of filling curve

Type `enum` in `['FULL', 'BACK', 'FRONT', 'HALF']`, default `'FULL'`

materials

Type `IDMaterials bpy_prop_collection` of `Material`, (readonly)

offset

Offset the curve to adjust the width of a text

Type `float` in `[-inf, inf]`, default `0.0`

path_duration

The number of frames that are needed to traverse the path, defining the maximum value for the 'Evaluation Time' setting

Type `int` in `[1, 300000]`, default `0`

render_resolution_u

Surface resolution in U direction used while rendering. Zero skips this property

Type `int` in `[0, 32767]`, default `0`

render_resolution_v

Surface resolution in V direction used while rendering. Zero skips this property

Type `int` in `[0, 32767]`, default `0`

resolution_u

Surface resolution in U direction

Type `int` in `[1, 32767]`, default `0`

resolution_v

Surface resolution in V direction

Type int in [1, 32767], default 0**shape_keys****Type** Key, (readonly)**show_handles**

Display Bezier handles in editmode

Type boolean, default False**show_normal_face**

Display 3D curve normals in editmode

Type boolean, default False**splines**

Collection of splines in this curve data object

Type CurveSplines bpy_prop_collection of Spline, (readonly)**taper_object**

Curve object name that defines the taper (width)

Type Object**texspace_location**

Texture space location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**texspace_size**

Texture space size

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**twist_mode**

The type of tilt calculation for 3D Curves

- Z_UP Z-Up, Use Z-Up axis to calculate the curve twist at each point.
- MINIMUM Minimum, Use the least twist over the entire curve.
- TANGENT Tangent, Use the tangent to calculate twist.

Type enum in ['Z_UP', 'MINIMUM', 'TANGENT'], default 'Z_UP'**twist_smooth**

Smoothing iteration for tangents

Type float in [-inf, inf], default 0.0**use_auto_texspace**

Adjusts active object's texture space automatically when transforming object

Type boolean, default False**use_deform_bounds**

Use the mesh bounds to clamp the deformation

Type boolean, default False

use_fill_deform

Fill curve after applying shape keys and all modifiers

Type boolean, default False

use_path

Enable the curve to become a translation path

Type boolean, default False

use_path_follow

Make curve path children to rotate along the path

Type boolean, default False

use_radius

Option for paths: apply the curve radius with path following it and deforming

Type boolean, default False

use_stretch

Option for curve-deform: makes deformed child to stretch along entire path

Type boolean, default False

use_time_offset

Children will use TimeOffs value as path distance offset

Type boolean, default False

use_uv_as_generated

Uses the UV values as Generated textured coordinates

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.curves`
- `BlendDataCurves.new`
- `BlendDataCurves.remove`

2.4.185 CurveMap(bpy_struct)

base class — `bpy_struct`

class `bpy.types.CurveMap` (*bpy_struct*)

Curve in a curve mapping

extend

Extrapolate the curve or extend it horizontally

Type enum in ['HORIZONTAL', 'EXTRAPOLATED'], default 'HORIZONTAL', (readonly)

points

Type `bpy_prop_collection` of `CurveMapPoint`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `CurveMapping.curves`

2.4.186 CurveMapPoint(bpy_struct)

base class — `bpy_struct`

class `bpy.types.CurveMapPoint` (*bpy_struct*)

Point of a curve used for a curve mapping

handle_type

Curve interpolation at this point: Bezier or vector

Type enum in ['AUTO', 'VECTOR'], default 'AUTO', (readonly)

location

X/Y coordinates of the curve point

Type float array of 2 items in [-inf, inf], default (0.0, 0.0), (readonly)

select

Selection state of the curve point

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `CurveMap.points`

2.4.187 CurveMapping(bpy_struct)

base class — `bpy_struct`

class `bpy.types.CurveMapping` (*bpy_struct*)

Curve mapping to map color, vector and scalar values to other values using a user defined curve

black_level

For RGB curves, the color that black is mapped to

Type float array of 3 items in [-1000, 1000], default (0.0, 0.0, 0.0)

clip_max_x

Type float in [-100, 100], default 0.0

clip_max_y

Type float in [-100, 100], default 0.0

clip_min_x

Type float in [-100, 100], default 0.0

clip_min_y

Type float in [-100, 100], default 0.0

curves

Type `bpy_prop_collection` of `CurveMap`, (readonly)

use_clip

Force the curve view to fit a defined boundary

Type boolean, default False

white_level

For RGB curves, the color that white is mapped to

Type float array of 3 items in [-1000, 1000], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Brush.curve`
- `CompositorNodeCurveRGB.mapping`
- `CompositorNodeCurveVec.mapping`
- `CompositorNodeHueCorrect.mapping`
- `CompositorNodeTime.curve`
- `ParticleBrush.curve`
- `PointDensity.falloff_curve`
- `PointLamp.falloff_curve`
- `ShaderNodeRGBCurve.mapping`
- `ShaderNodeVectorCurve.mapping`
- `SpaceImageEditor.curve`
- `SpotLamp.falloff_curve`
- `TextureNodeCurveRGB.mapping`
- `TextureNodeCurveTime.curve`
- `VertexWeightEditModifier.map_curve`
- `WarpModifier.falloff_curve`

2.4.188 CurveModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.CurveModifier` (*Modifier*)

Curve deformation modifier

deform_axis

The axis that the curve deforms along

Type enum in ['POS_X', 'POS_Y', 'POS_Z', 'NEG_X', 'NEG_Y', 'NEG_Z'], default 'POS_X'

object

Curve object to deform with

Type Object

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.189 CurveSplines(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.CurveSplines` (*bpy_struct*)
Collection of curve splines

active

Active curve spline

Type `Object`

new (*type*)

Add a new spline to the curve

Parameters `type` (*enum in ['POLY', 'BEZIER', 'BSPLINE', 'CARDINAL', 'NURBS']*) – type for the new spline

Returns The newly created spline

Return type `Spline`

remove (*spline*)

Remove a spline from a curve

Parameters `spline` (`Spline`, (never `None`)) – The spline to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Curve.splines`

2.4.190 DampedTrackConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.DampedTrackConstraint` (*Constraint*)

Points toward target by taking the shortest rotation path

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

subtarget

Type string, default ""

target

Target Object

Type `Object`

track_axis

Axis that points to the target object

Type enum in ['TRACK_X', 'TRACK_Y', 'TRACK_Z', 'TRACK_NEGATIVE_X', 'TRACK_NEGATIVE_Y', 'TRACK_NEGATIVE_Z'], default 'TRACK_X'

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.191 DecimateModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.DecimateModifier` (*Modifier*)
Decimation modifier

face_count

The current number of faces in the decimated mesh

Type `int` in `[-inf, inf]`, default 0, (readonly)

ratio

Defines the ratio of triangles to reduce to

Type `float` in `[0, 1]`, default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.192 DelaySensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.DelaySensor` (*Sensor*)
Sensor to send delayed events

delay

Delay in number of logic tics before the positive trigger (default 60 per second)

Type int in [0, 5000], default 0

duration

If >0, delay in number of logic tics before the negative trigger following the positive trigger

Type int in [0, 5000], default 0

use_repeat

Toggle repeat option. If selected, the sensor restarts after Delay+Dur logic tics

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.193 DisplaceModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.DisplaceModifier` (*Modifier*)
Displacement modifier

direction

- **X** X, Uses the texture's intensity value to displace in the X direction.
- **Y** Y, Uses the texture's intensity value to displace in the Y direction.
- **Z** Z, Uses the texture's intensity value to displace in the Z direction.
- **NORMAL** Normal, Uses the texture's intensity value to displace in the normal direction.
- **RGB_TO_XYZ** RGB to XYZ, Uses the texture's RGB values to displace the mesh in the XYZ direction.

Type enum in ['X', 'Y', 'Z', 'NORMAL', 'RGB_TO_XYZ'], default 'X'

mid_level

Material value that gives no displacement

Type float in [-inf, inf], default 0.0

strength

Amount to displace geometry

Type float in [-inf, inf], default 0.0

texture

Type `Texture`

texture_coords

- LOCAL Map, Uses the local coordinate system for the texture coordinates.
- GLOBAL Global, Uses the global coordinate system for the texture coordinates.
- OBJECT Object, Uses the linked object's local coordinate system for the texture coordinates.
- UV UV, Uses UV coordinates for the texture coordinates.

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

texture_coords_object

Object to set the texture coordinates

Type `Object`

uv_layer

UV layer name

Type string, default ""

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.194 DistortedNoiseTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.DistortedNoiseTexture` (*Texture*)

Procedural distorted noise texture

distortion

Amount of distortion

Type float in [0, 10], default 0.0

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_basis

Sets the noise basis used for turbulence

- `BLENDER_ORIGINAL` Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- `ORIGINAL_PERLIN` Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- `IMPROVED_PERLIN` Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- `VORONOI_F1` Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- `VORONOI_F2` Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- `VORONOI_F3` Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- `VORONOI_F4` Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- `VORONOI_F2_F1` Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- `VORONOI_CRACKLE` Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- `CELL_NOISE` Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_distortion

Sets the noise basis for the distortion

- **BLENDER_ORIGINAL** Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- **ORIGINAL_PERLIN** Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- **IMPROVED_PERLIN** Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- **VORONOI_F1** Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- **VORONOI_F2** Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- **VORONOI_F3** Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- **VORONOI_F4** Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- **VORONOI_F2_F1** Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- **VORONOI_CRACKLE** Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- **CELL_NOISE** Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`

- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.195 DomainFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.DomainFluidSettings` (*FluidSettings*)
 Fluid simulation settings for the domain of a fluid simulation

compressibility

Allowed compressibility due to gravitational force for standing fluid. (directly affects simulation step size)

Type float in [0.001, 0.1], default 0.0

end_time

Simulation time of the last blender frame (in seconds)

Type float in [0, 100], default 0.0

filepath

Directory (and/or filename prefix) to store baked fluid simulation files in

Type string, default ""

fluid_mesh_vertices

Vertices of the fluid mesh generated by simulation

Type bpy_prop_collection of FluidMeshVertex, (readonly)

generate_particles

Amount of particles to generate (0=off, 1=normal, >1=more)

Type float in [0, 10], default 0.0

gravity

Gravity in X, Y and Z direction

Type float array of 3 items in [-1000.1, 1000.1], default (0.0, 0.0, 0.0)

grid_levels

Number of coarsened grids to use (-1 for automatic)

Type int in [-1, 4], default 0

memory_estimate

Estimated amount of memory needed for baking the domain

Type string, default "", (readonly)

partial_slip_factor

Amount of mixing between no- and free-slip, 0 is no slip and 1 is free slip

Type float in [0, 1], default 0.0

preview_resolution

Preview resolution in X,Y and Z direction

Type int in [1, 100], default 0

render_display_mode

How to display the mesh for rendering

- GEOMETRY Geometry, Display geometry.
- PREVIEW Preview, Display preview quality results.
- FINAL Final, Display final quality results.

Type enum in ['GEOMETRY', 'PREVIEW', 'FINAL'], default 'GEOMETRY'

resolution

Domain resolution in X,Y and Z direction

Type int in [1, 1024], default 0

simulation_scale

Size of the simulation domain in metres

Type float in [0.001, 10], default 0.0

slip_type

- NOSLIP No Slip, Obstacle causes zero normal and tangential velocity (=sticky). Default for all. Only option for moving objects.
- PARTIALSLIP Partial Slip, Mix between no-slip and free-slip. Non moving objects only!.
- FREESLIP Free Slip, Obstacle only causes zero normal velocity (=not sticky). Non moving objects only!.

Type enum in ['NOSLIP', 'PARTIALSLIP', 'FREESLIP'], default 'NOSLIP'

start_time

Simulation time of the first blender frame (in seconds)

Type float in [0, 100], default 0.0

surface_noobs

Type boolean, default False

surface_smooth

Amount of surface smoothing. A value of 0 is off, 1 is normal smoothing and more than 1 is extra smoothing

Type float in [0, 5], default 0.0

surface_subdivisions

Number of isosurface subdivisions. This is necessary for the inclusion of particles into the surface generation. Warning - can lead to longer computation times!

Type int in [0, 5], default 0

tracer_particles

Number of tracer particles to generate

Type int in [0, 10000], default 0

use_reverse_frames

Reverse fluid frames

Type boolean, default False

use_speed_vectors

Generate speed vectors for vector blur

Type boolean, default False

use_time_override

Use a custom start and end time (in seconds) instead of the scene's timeline

Type boolean, default False

viewport_display_mode

How to display the mesh in the viewport

- GEOMETRY Geometry, Display geometry.
- PREVIEW Preview, Display preview quality results.
- FINAL Final, Display final quality results.

Type enum in ['GEOMETRY', 'PREVIEW', 'FINAL'], default 'GEOMETRY'

viscosity_base

Viscosity setting: value that is multiplied by 10 to the power of (exponent*-1)

Type float in [0, 10], default 0.0

viscosity_exponent

Negative exponent for the viscosity value (to simplify entering small values e.g. $5 \cdot 10^{-6}$.)

Type int in [0, 10], default 0

viscosity_preset

Set viscosity of the fluid to a preset value, or use manual input

- MANUAL Manual, Manual viscosity settings.
- WATER Water, Viscosity of $1.0 \cdot 10^{-6}$.
- OIL Oil, Viscosity of $5.0 \cdot 10^{-5}$.
- HONEY Honey, Viscosity of $2.0 \cdot 10^{-3}$.

Type enum in ['MANUAL', 'WATER', 'OIL', 'HONEY'], default 'MANUAL'

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.196 DopeSheet(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DopeSheet` (*bpy_struct*)

Settings for filtering the channels shown in Animation Editors

filter_fcurve_name

F-Curve live filtering string

Type string, default ""

filter_group

Group that included Object should be a member of

Type Group

show_armatures

Include visualization of Armature related Animation data

Type boolean, default False

show_cameras

Include visualization of Camera related Animation data

Type boolean, default False

show_curves

Include visualization of Curve related Animation data

Type boolean, default False

show_datablock_filters

Show options for whether channels related to certain types of data are included

Type boolean, default False

show_expanded_summary

Collapse summary when shown, so all other channels get hidden (DopeSheet Editors Only)

Type boolean, default False

show_hidden

Include channels from objects/bone that aren't visible

Type boolean, default False

show_lamps

Include visualization of Lamp related Animation data

Type boolean, default False

show_lattices

Include visualization of Lattice related Animation data

Type boolean, default False

show_materials

Include visualization of Material related Animation data

Type boolean, default False

show_meshes

Include visualization of Mesh related Animation data

Type boolean, default False

show_metaballs

Include visualization of Metaball related Animation data

Type boolean, default False

show_missing_nla

Include Animation Data blocks with no NLA data (NLA Editor only)

Type boolean, default False

show_nodes

Include visualization of Node related Animation data

Type boolean, default False

show_only_group_objects

Only include channels from Objects in the specified Group

Type boolean, default False

show_only_matching_fcurves

Only include F-Curves with names containing search text

Type boolean, default False

show_only_selected

Only include channels relating to selected objects and data

Type boolean, default False

show_particles

Include visualization of Particle related Animation data

Type boolean, default False

show_scenes

Include visualization of Scene related Animation data

Type boolean, default False

show_shapekeys

Include visualization of ShapeKey related Animation data

Type boolean, default False

show_speakers

Include visualization of Speaker related Animation data

Type boolean, default False

show_summary

Display an additional 'summary' line (DopeSheet Editors only)

Type boolean, default False

show_textures

Include visualization of Texture related Animation data

Type boolean, default False

show_transforms

Include visualization of Object-level Animation data (mostly Transforms)

Type boolean, default False

show_worlds

Include visualization of World related Animation data

Type boolean, default False

source

ID-Block representing source data, currently ID_SCE (for Dopesheet), and ID_SC (for Grease Pencil)

Type ID, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceDopeSheetEditor.dopesheet`
- `SpaceGraphEditor.dopesheet`
- `SpaceNLA.dopesheet`

2.4.197 Driver(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Driver` (*bpy_struct*)

Driver for the value of a setting based on an external value

expression

Expression to use for Scripted Expression

Type string, default ""

is_valid

Driver could not be evaluated in past, so should be skipped

Type boolean, default False

show_debug_info

Show intermediate values for the driver calculations to allow debugging of drivers

Type boolean, default False

type

Driver type

Type enum in ['AVERAGE', 'SUM', 'SCRIPTED', 'MIN', 'MAX'], default 'AVERAGE'

variables

Properties acting as inputs for this driver

Type `ChannelDriverVariables` `bpy_prop_collection` of `DriverVariable`,
(readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.driver`

2.4.198 `DriverTarget(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.DriverTarget` (*bpy_struct*)

Source of input values for driver variables

bone_target

Name of PoseBone to use as target

Type string, default ""

data_path

RNA Path (from ID-block) to property used

Type string, default ""

id

ID-block that the specific property used can be found from (id_type property must be set first)

Type ID

id_type

Type of ID-block that can be used

Type enum in ['ACTION', 'ARMATURE', 'BRUSH', 'CAMERA', 'CURVE', 'FONT', 'GREASEPENCIL', 'GROUP', 'IMAGE', 'KEY', 'LAMP', 'LIBRARY', 'LATTICE', 'MATERIAL', 'META', 'MESH', 'NODETREE', 'OBJECT', 'PARTICLE', 'SCENE', 'SCREEN', 'SPEAKER', 'SOUND', 'TEXT', 'TEXTURE', 'WORLD', 'WINDOWMANAGER'], default 'OBJECT'

ttransform_space

Space in which transforms are used

- **WORLD_SPACE** World Space, Transforms include effects of parenting/restpose and constraints.
- **TRANSFORM_SPACE** Transform Space, Transforms don't include parenting/restpose or constraints.
- **LOCAL_SPACE** Local Space, Transforms include effects of constraints but not parenting/restpose.

Type enum in ['WORLD_SPACE', 'TRANSFORM_SPACE', 'LOCAL_SPACE'], default 'WORLD_SPACE'

ttransform_type

Driver variable type

Type enum in ['LOC_X', 'LOC_Y', 'LOC_Z', 'ROT_X', 'ROT_Y', 'ROT_Z', 'SCALE_X', 'SCALE_Y', 'SCALE_Z'], default 'LOC_X'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DriverVariable.targets`

2.4.199 DriverVariable(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DriverVariable` (*bpy_struct*)

Variable from some source/target for driver relationship

name

Name to use in scripted expressions/functions (no spaces or dots are allowed, and must start with a letter)

Type string, default ""

targets

Sources of input data for evaluating this variable

Type `bpy_prop_collection` of `DriverTarget`, (readonly)

type

Driver variable type

- `SINGLE_PROP` Single Property, Use the value from some RNA property (Default).
- `TRANSFORMS` Transform Channel, Final transformation value of object or bone.
- `ROTATION_DIFF` Rotational Difference, Use the angle between two bones.
- `LOC_DIFF` Distance, Distance between two bones or objects.

Type enum in [`'SINGLE_PROP'`, `'TRANSFORMS'`, `'ROTATION_DIFF'`, `'LOC_DIFF'`], default `'SINGLE_PROP'`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ChannelDriverVariables.new`
- `ChannelDriverVariables.remove`
- `Driver.variables`

2.4.200 DupliObject(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DupliObject` (*bpy_struct*)

An object duplicate

matrix

Object duplicate transformation matrix

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_original

The original matrix of this object before it was duplicated

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

object

Object being duplicated

Type `Object`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.dupli_list`

2.4.201 DynamicPaintBrushSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DynamicPaintBrushSettings` (*bpy_struct*)

Brush settings

invert_proximity

Proximity falloff is applied inside the volume

Type boolean, default False

material

Material to use (if not defined, material linked to the mesh is used)

Type `Material`

paint_alpha

Paint alpha

Type float in [0, 1], default 0.0

paint_color

Color of the paint

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

paint_distance

Maximum distance from brush to mesh surface to affect paint

Type float in [0, 500], default 0.0

paint_ramp

Color ramp used to define proximity falloff

Type `ColorRamp`, (readonly)

paint_source

Type enum in ['PARTICLE_SYSTEM', 'POINT', 'DISTANCE', 'VOLUME_DISTANCE', 'VOLUME'], default 'VOLUME'

paint_wetness

Paint wetness, visible in wetmap (some effects only affect wet paint)

Type float in [0, 1], default 0.0

particle_system

The particle system to paint with

Type `ParticleSystem`

proximity_falloff

Proximity falloff type

Type enum in ['SMOOTH', 'CONSTANT', 'RAMP'], default 'CONSTANT'

ray_direction

Ray direction to use for projection (if brush object is located in that direction it's painted)

Type enum in ['CANVAS', 'BRUSH', 'Z_AXIS'], default 'CANVAS'

smooth_radius

Smooth falloff added after solid radius

Type float in [0, 10], default 0.0

smudge_strength

Smudge effect strength

Type float in [0, 1], default 0.0

solid_radius

Radius that will be painted solid

Type float in [0.01, 10], default 0.0

use_absolute_alpha

Only increase alpha value if paint alpha is higher than existing

Type boolean, default False

use_material

Use object material to define color and influence

Type boolean, default False

use_negative_volume

Negate influence inside the volume

Type boolean, default False

use_paint_erase

Erase / remove paint instead of adding it

Type boolean, default False

use_particle_radius

Use radius from particle settings

Type boolean, default False

use_proximity_project

Brush is projected to canvas from defined direction within brush proximity

Type boolean, default False

use_proximity_ramp_alpha

Only read color ramp alpha

Type boolean, default False

use_smudge

Make this brush to smudge existing paint as it moves

Type boolean, default False

use_velocity_alpha

Multiply brush influence by velocity color ramp alpha

Type boolean, default False

use_velocity_color

Replace brush color by velocity color ramp

Type boolean, default False

use_velocity_depth

Multiply brush intersection depth (displace, waves) by velocity ramp alpha

Type boolean, default False

velocity_max

Velocity considered as maximum influence (Blender units per frame)

Type float in [0.0001, 10], default 0.0

velocity_ramp

Color ramp used to define brush velocity effect

Type ColorRamp, (readonly)

wave_clamp

Maximum level of surface intersection used to influence waves (use 0.0 to disable)

Type float in [0, 50], default 0.0

wave_factor

Multiplier for wave influence of this brush

Type float in [-2, 2], default 0.0

wave_type

Type enum in ['CHANGE', 'DEPTH', 'FORCE', 'REFLECT'], default 'DEPTH'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DynamicPaintModifier.brush_settings`

2.4.202 DynamicPaintCanvasSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DynamicPaintCanvasSettings` (*bpy_struct*)
Dynamic Paint canvas settings

canvas_surfaces

Paint surface list

Type `DynamicPaintSurfaces` `bpy_prop_collection` of
`DynamicPaintSurface`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DynamicPaintModifier.canvas_settings`

2.4.203 DynamicPaintModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.DynamicPaintModifier` (*Modifier*)
Dynamic Paint modifier

brush_settings

Type `DynamicPaintBrushSettings`, (readonly)

canvas_settings

Type `DynamicPaintCanvasSettings`, (readonly)

ui_type

Type enum in ['CANVAS', 'BRUSH'], default 'CANVAS'

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.204 DynamicPaintSurface(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DynamicPaintSurface` (*bpy_struct*)

A canvas surface layer

brush_group

Only use brush objects from this group

Type Group

color_spread_speed

How fast colors get mixed within wet paint

Type float in [0, 2], default 0.0

depth_clamp

Maximum level of depth intersection in object space (use 0.0 to disable)

Type float in [0, 50], default 0.0

displace_factor

Strength of displace when applied to the mesh

Type float in [-50, 50], default 0.0

displace_type

Type enum in ['DISPLACE', 'DEPTH'], default 'DISPLACE'

dissolve_speed

Approximately in how many frames should dissolve happen

Type int in [1, 10000], default 0

drip_acceleration

How much surface acceleration affects dripping

Type float in [-200, 200], default 0.0

drip_velocity

How much surface velocity affects dripping

Type float in [-200, 200], default 0.0

dry_speed

Approximately in how many frames should drying happen

Type int in [1, 10000], default 0

effect_ui

Type enum in ['SPREAD', 'DRIP', 'SHRINK'], default 'SPREAD'

effector_weights

Type `EffectorWeights`, (readonly)

frame_end

Simulation end frame

Type int in [1, 9999], default 0

frame_start

Simulation start frame

Type int in [1, 9999], default 0

frame_substeps

Do extra frames between scene frames to ensure smooth motion

Type int in [0, 10], default 0

image_fileformat

Type enum in ['PNG'], default 'PNG'

image_output_path

Directory to save the textures

Type string, default ""

image_resolution

Output image resolution

Type int in [16, 4096], default 0

init_color

Initial color of the surface

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

init_color_type

Type enum in ['NONE', 'COLOR', 'TEXTURE', 'VERTEX_COLOR'], default 'NONE'

init_layername

Type string, default ""

init_texture

Type [Texture](#)

is_active

Toggle whether surface is processed or ignored

Type boolean, default False

is_cache_user

Type boolean, default False, (readonly)

name

Surface name

Type string, default ""

output_name_a

Type string, default ""

output_name_b

Output name

Type string, default ""

point_cache

Type [PointCache](#), (readonly, never None)

preview_id

Type enum in ['PAINT', 'WETMAP'], default 'PAINT'

show_preview

Display surface preview in 3D-views

Type boolean, default False

shrink_speed

How fast shrink effect moves on the canvas surface

Type float in [0.001, 10], default 0.0

spread_speed

How fast spread effect moves on the canvas surface

Type float in [0.001, 10], default 0.0

surface_format

Surface Format

Type enum in ['VERTEX', 'IMAGE'], default 'VERTEX'

surface_type

Surface Type

Type enum in ['PAINT'], default 'PAINT'**use_antialiasing**

Use 5x multisampling to smoothen paint edges

Type boolean, default False**use_dissolve**

Enable to make surface changes disappear over time

Type boolean, default False**use_dissolve_log**

Use logarithmic dissolve (makes high values to fade faster than low values)

Type boolean, default False**use_drip**

Process drip effect (drip wet paint to gravity direction)

Type boolean, default False**use_dry_log**

Use logarithmic drying (makes high values to fade faster than low values)

Type boolean, default False**use_incremental_displace**

New displace is added cumulatively on top of existing

Type boolean, default False**use_output_a**

Output name

Type boolean, default False**use_output_b****Type** boolean, default False**use_premultiply**

Multiply color by alpha (recommended for Blender input)

Type boolean, default False**use_shrink**

Process shrink effect (shrink paint areas)

Type boolean, default False**use_spread**

Process spread effect (spread wet paint around surface)

Type boolean, default False**use_wave_open_border**

Pass waves through mesh edges

Type boolean, default False**uv_layer**

UV layer name

Type string, default ""

wave_damping

Wave damping factor

Type float in [0.001, 1], default 0.0

wave_speed

Wave propagation speed

Type float in [0.01, 5], default 0.0

wave_spring

Spring force that pulls water level back to zero

Type float in [0.001, 1], default 0.0

wave_timescale

Wave time scaling factor

Type float in [0.01, 3], default 0.0

output_exists (*object, index*)

Checks if surface output layer of given name exists

Parameters *index* (*int in [0, 1]*) – Index

Return type boolean

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DynamicPaintCanvasSettings.canvas_surfaces`
- `DynamicPaintSurfaces.active`

2.4.205 DynamicPaintSurfaces(bpy_struct)

base class — `bpy_struct`

class `bpy.types.DynamicPaintSurfaces` (*bpy_struct*)
Collection of Dynamic Paint Canvas surfaces

active

Active Dynamic Paint surface being displayed

Type `DynamicPaintSurface`, (readonly)

active_index

Type `int` in `[0, inf]`, default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DynamicPaintCanvasSettings.canvas_surfaces`

2.4.206 EdgeSplitModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.EdgeSplitModifier` (*Modifier*)
Edge splitting modifier to create sharp edges

split_angle

Angle above which to split edges

Type `float` in `[0, 3.14159]`, default 0.0

use_edge_angle

Split edges with high angle between faces

Type boolean, default False

use_edge_sharp

Split edges that are marked as sharp

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.207 EditBone(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.EditBone` (*bpy_struct*)
Editmode bone in an Armature datablock

bbone_in

Length of first Bezier Handle (for B-Bones only)

Type float in [0, 2], default 0.0

bbone_out

Length of second Bezier Handle (for B-Bones only)

Type float in [0, 2], default 0.0

bbone_segments

Number of subdivisions of bone (for B-Bones only)

Type int in [1, 32], default 0

bbone_x

B-Bone X size

Type float in [0, 1000], default 0.0

bbone_z

B-Bone Z size

Type float in [0, 1000], default 0.0

envelope_distance

Bone deformation distance (for Envelope deform only)

Type float in [0, 1000], default 0.0

envelope_weight

Bone deformation weight (for Envelope deform only)

Type float in [0, 1000], default 0.0

head

Location of head end of the bone

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

head_radius

Radius of head of bone (for Envelope deform only)

Type float in [0, inf], default 0.0

hide

Bone is not visible when in Edit Mode

Type boolean, default False

hide_select

Bone is able to be selected

Type boolean, default False

layers

Layers bone exists in

Type boolean array of 32 items, default (False, False)

lock

Bone is not able to be transformed when in Edit Mode

Type boolean, default False

matrix

Read-only matrix calculated from the roll (armature space)

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0), (readonly)

name

Type string, default ""

parent

Parent edit bone (in same Armature)

Type `EditBone`

roll

Bone rotation around head-tail axis

Type float in $[-\text{inf}, \text{inf}]$, default 0.0

select

Type boolean, default False

select_head

Type boolean, default False

select_tail

Type boolean, default False

show_wire

Bone is always drawn as Wireframe regardless of viewport draw mode (useful for non-obstructive custom bone shapes)

Type boolean, default False

tail

Location of tail end of the bone

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

tail_radius

Radius of tail of bone (for Envelope deform only)

Type float in $[0, \text{inf}]$, default 0.0

use_connect

When bone has a parent, bone's head is stuck to the parent's tail

Type boolean, default False

use_cyclic_offset

When bone doesn't have a parent, it receives cyclic offset effects

Type boolean, default False

use_deform

Bone does not deform any geometry

Type boolean, default False

use_envelope_multiply

When deforming bone, multiply effects of Vertex Group weights with Envelope influence

Type boolean, default False

use_inherit_rotation

Bone inherits rotation or scale from parent bone

Type boolean, default False

use_inherit_scale

Bone inherits scaling from parent bone

Type boolean, default False

use_local_location

Bone location is set in local space

Type boolean, default False

basename

The name of this bone before any ‘.’ character (readonly)

center

The midpoint between the head and the tail. (readonly)

children

A list of all the bones children. (readonly)

children_recursive

A list of all children from this bone. (readonly)

children_recursive_basename

Returns a chain of children with the same base name as this bone. Only direct chains are supported, forks caused by multiple children with matching base names will terminate the function and not be returned. (readonly)

length

The distance from head to tail, when set the head is moved to fit the length.

parent_recursive

A list of parents, starting with the immediate parent (readonly)

vector

The direction this bone is pointing. Utility function for (tail - head)
(readonly)

x_axis

Vector pointing down the x-axis of the bone. (readonly)

y_axis

Vector pointing down the x-axis of the bone. (readonly)

z_axis

Vector pointing down the x-axis of the bone. (readonly)

align_roll (*vector*)

Align the bone to a localspace roll so the Z axis points in the direction of the vector given

Parameters **vector** (*float array of 3 items in [-inf, inf]*) – Vector

align_orientation (*other*)

Align this bone to another by moving its tail and settings its roll the length of the other bone is not used.

parent_index (*parent_test*)

The same as ‘bone in other_bone.parent_recursive’ but saved generating a list.

t_transform (*matrix, scale=True, roll=True*)

Transform the the bones head, tail, roll and envelope (when the matrix has a scale component).

Parameters

- **matrix** (*mathutils.Matrix*) – 3x3 or 4x4 transformation matrix.
- **scale** (*bool*) – Scale the bone envelope by the matrix.

- **roll** (*bool*) – Correct the roll to point in the same relative direction to the head and tail.

translate (*vec*)

Utility function to add *vec* to the head and tail of this bone

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Armature.edit_bones`
- `ArmatureEditBones.active`
- `ArmatureEditBones.new`
- `ArmatureEditBones.remove`
- `EditBone.parent`

2.4.208 EditObjectActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.EditObjectActuator` (*Actuator*)

Actuator used to edit objects

angular_velocity

Angular velocity upon creation

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

dynamic_operation

Type enum in ['RESTOREDYN', 'SUSPENDDYN', 'ENABLERIGIDBODY', 'DISABLE-RIGIDBODY', 'SETMASS'], default 'RESTOREDYN'

linear_velocity

Velocity upon creation

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**mass**

The mass of the object

Type float in [-inf, inf], default 0.0**mesh**

Replace the existing, when left blank 'Phys' will remake the existing physics mesh

Type [Mesh](#)**mode**

The mode of the actuator

Type enum in ['ADDOBJECT', 'ENDOBJECT', 'REPLACEMESH', 'TRACKTO', 'DYNAMICS'], default 'ADDOBJECT'**object**

Add this Object and all its children (can't be on a visible layer)

Type [Object](#)**time**

Duration the new Object lives or the track takes

Type int in [-inf, inf], default 0**track_object**

Track to this Object

Type [Object](#)**use_3d_tracking**

Enable 3D tracking

Type boolean, default False**use_local_angular_velocity**

Apply the rotation locally

Type boolean, default False**use_local_linear_velocity**

Apply the transformation locally

Type boolean, default False**use_replace_display_mesh**

Replace the display mesh

Type boolean, default False**use_replace_physics_mesh**

Replace the physics mesh (triangle bounds only - compound shapes not supported)

Type boolean, default False**Inherited Properties**

- [bpy_struct.id_data](#)

- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.209 EffectSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

subclasses — `GlowSequence`, `PluginSequence`, `TransformSequence`, `WipeSequence`, `ColorSequence`, `SpeedControlSequence`

class `bpy.types.EffectSequence` (*Sequence*)

Sequence strip applying an effect on the images created by other strips

color_balance

Type `SequenceColorBalance`, (readonly)

color_multiply

Type float in [0, 20], default 0.0

color_saturation

Type float in [0, 20], default 0.0

crop

Type `SequenceCrop`, (readonly)

proxy

Type `SequenceProxy`, (readonly)

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

ttransform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.210 EffectorWeights(bpy_struct)

base class — `bpy_struct`

class `bpy.types.EffectorWeights` (*bpy_struct*)
Effector weights for physics simulation

all

All effector's weight

Type float in [-200, 200], default 0.0

apply_to_hair_growing

Use force fields when growing hair

Type boolean, default False

boid

Boid effector weight

Type float in [-200, 200], default 0.0

charge

Charge effector weight

Type float in [-200, 200], default 0.0

curve_guide

Curve guide effector weight

Type float in [-200, 200], default 0.0

drag

Drag effector weight

Type float in [-200, 200], default 0.0

force

Force effector weight

Type float in [-200, 200], default 0.0

gravity

Global gravity weight

Type float in [-200, 200], default 0.0

group

Limit effectors to this Group

Type `Group`

harmonic

Harmonic effector weight

Type float in [-200, 200], default 0.0

lennardjones

Lennard-Jones effector weight

Type float in [-200, 200], default 0.0

magnetic

Magnetic effector weight

Type float in [-200, 200], default 0.0

texture

Texture effector weight

Type float in [-200, 200], default 0.0

turbulence

Turbulence effector weight

Type float in [-200, 200], default 0.0

vortex

Vortex effector weight

Type float in [-200, 200], default 0.0

wind

Wind effector weight

Type float in [-200, 200], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ClothSettings.effector_weights`
- `DynamicPaintSurface.effector_weights`
- `ParticleSettings.effector_weights`
- `SmokeDomainSettings.effector_weights`
- `SoftBodySettings.effector_weights`

2.4.211 EnumProperty(Property)

base classes — `bpy_struct`, `Property`

```

class bpy.types.EnumProperty(Property)
    RNA enumeration property definition, to choose from a number of predefined options

    default
        Default value for this enum
        Type enum in ['DUMMY'], default 'DUMMY', (readonly)

    default_flag
        Default value for this enum
        Type enum set in {'DUMMY'}, default set(), (readonly)

    enum_items
        Possible values for the property
        Type bpy_prop_collection of EnumPropertyItem, (readonly)

```

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.212 EnumPropertyItem(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.EnumPropertyItem` (*bpy_struct*)

Definition of a choice in an RNA enum property

description

Description of the item's purpose

Type string, default "", (readonly)

identifier

Unique name used in the code and scripting

Type string, default "", (readonly)

name

Human readable name

Type string, default "", (readonly)

value

Value of the item

Type int in [0, inf], default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `EnumProperty.enum_items`

2.4.213 EnvironmentMap(bpy_struct)

base class — `bpy_struct`

class `bpy.types.EnvironmentMap` (*bpy_struct*)

Environment map created by the renderer and cached for subsequent renders

clip_end

Objects further than this are not visible to map

Type float in [0.01, inf], default 0.0

clip_start

Objects nearer than this are not visible to map

Type float in [0.001, inf], default 0.0

depth

Number of times a map will be rendered recursively (mirror effects)

Type int in [0, 5], default 0

is_valid

True if this map is ready for use, False if it needs rendering

Type boolean, default False, (readonly)

layers_ignore

Hide objects on these layers when generating the Environment Map

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

mapping

- **CUBE** Cube, Use environment map with six cube sides.
- **PLANE** Plane, Only one side is rendered, with Z axis pointing in direction of image.

Type enum in ['CUBE', 'PLANE'], default 'CUBE'

resolution

Pixel resolution of the rendered environment map

Type int in [50, 4096], default 0

source

- **STATIC** Static, Calculate environment map only once.
- **ANIMATED** Animated, Calculate environment map at each rendering.
- **IMAGE_FILE** Image File, Load a saved environment map image from disk.

Type enum in ['STATIC', 'ANIMATED', 'IMAGE_FILE'], default 'STATIC'

viewpoint_object

Object to use as the environment map's viewpoint location

Type `Object`

zoom

Type float in [0.1, 5], default 0.0

clear ()

Discard the environment map and free it from memory

save (*filepath*, *scene=None*, *layout=(0.0, 0.0, 1.0, 0.0, 2.0, 0.0, 0.0, 1.0, 1.0, 1.0, 2.0, 1.0)*)

Save the environment map to disc using the scene render settings

Parameters

- **filepath** (*string*) – File path, Location of the output file
- **scene** (`Scene`, (optional)) – Overrides the scene from which image parameters are taken
- **layout** (*float array of 12 items in [-inf, inf], (optional)*) – File layout, Flat array describing the X,Y position of each cube face in the output image, where 1 is the size of a face - order is [+Z -Z +Y -X -Y +X] (use -1 to skip a face)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `EnvironmentMapTexture.environment_map`

2.4.214 EnvironmentMapTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.EnvironmentMapTexture` (*Texture*)
Environment map texture

environment_map

Gets the environment map associated with this texture

Type `EnvironmentMap`, (readonly)

filter_eccentricity

Maximum eccentricity. Higher gives less blur at distant/oblique angles, but is also slower

Type int in [1, 256], default 0

filter_probes

Maximum number of samples. Higher gives less blur at distant/oblique angles, but is also slower

Type int in [1, 256], default 0

filter_size

Multiply the filter size used by MIP Map and Interpolation

Type float in [0.1, 50], default 0.0

filter_type

Texture filter to use for sampling image

Type enum in ['BOX', 'EWA', 'FELINE', 'AREA'], default 'BOX'

image

Source image file to read the environment map from

Type `Image`

image_user

Parameters defining which layer, pass and frame of the image is displayed

Type `ImageUser`, (readonly)

use_filter_size_min

Use Filter Size as a minimal filter value in pixels

Type boolean, default False

use_mipmap

Uses auto-generated MIP maps for the image

Type boolean, default False

use_mipmap_gauss

Use Gauss filter to sample down MIP maps

Type boolean, default False

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`

- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.215 Event(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Event` (*bpy_struct*)
Window Manager Event

alt

True when the Alt/Option key is held

Type boolean, default False, (readonly)

ascii

Single ASCII character for this event

Type string, default "", (readonly)

ctrl

True when the Ctrl key is held

Type boolean, default False, (readonly)

mouse_prev_x

The window relative vertical location of the mouse

Type int in [-inf, inf], default 0, (readonly)

mouse_prev_y

The window relative horizontal location of the mouse

Type int in [-inf, inf], default 0, (readonly)

mouse_region_x

The region relative vertical location of the mouse

Type int in [-inf, inf], default 0, (readonly)

mouse_region_y

The region relative horizontal location of the mouse

Type int in [-inf, inf], default 0, (readonly)

mouse_x

The window relative vertical location of the mouse

Type int in [-inf, inf], default 0, (readonly)

mouse_y

The window relative horizontal location of the mouse

Type int in [-inf, inf], default 0, (readonly)

oskey

True when the Cmd key is held

Type boolean, default False, (readonly)

shift

True when the Shift key is held

Type boolean, default False, (readonly)

type

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN',

'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE', (readonly)

unicode

Single unicode character for this event

Type string, default "", (readonly)

value

The type of event, only applies to some

Type enum in ['ANY', 'NOTHING', 'PRESS', 'RELEASE', 'CLICK', 'DOUBLE_CLICK'], default 'NOTHING', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Operator.invoke`
- `Operator.modal`
- `WindowManager.invoke_confirm`
- `WindowManager.invoke_props_popup`

2.4.216 ExplodeModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ExplodeModifier` (*Modifier*)
Explosion effect modifier based on a particle system

particle_uv

UV Layer to change with particle age

Type string, default ""

protect

Clean vertex group edges

Type float in [0, 1], default 0.0

show_alive

Show mesh when particles are alive

Type boolean, default False

show_dead

Show mesh when particles are dead

Type boolean, default False

show_unborn

Show mesh when particles are unborn

Type boolean, default False

use_edge_cut

Cut face edges for nicer shrapnel

Type boolean, default False

use_size

Use particle size for the shrapnel

Type boolean, default False

vertex_group

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.217 ExpressionController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.ExpressionController` (*Controller*)
Controller passing on events based on the evaluation of an expression

expression

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.218 FCurve(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.FCurve` (*bpy_struct*)

F-Curve defining values of a period of time

array_index

Index to the specific property affected by F-Curve if applicable

Type `int` in `[-inf, inf]`, default `0`

color

Color of the F-Curve in the Graph Editor

Type `float` array of 3 items in `[0, 1]`, default `(0.0, 0.0, 0.0)`

color_mode

Method used to determine color of F-Curve in Graph Editor

Type `enum` in `['AUTO_RAINBOW', 'AUTO_RGB', 'CUSTOM']`, default `'AUTO_RAINBOW'`

data_path

RNA Path to property affected by F-Curve

Type `string`, default `""`

driver

Channel Driver (only set for Driver F-Curves)

Type `Driver`, (readonly)

extrapolation

Type `enum` in `['CONSTANT', 'LINEAR']`, default `'CONSTANT'`

group

Action Group that this F-Curve belongs to

Type `ActionGroup`

hide

F-Curve and its keyframes are hidden in the Graph Editor graphs

Type boolean, default False

is_valid

False when F-Curve could not be evaluated in past, so should be skipped when evaluating

Type boolean, default False

keyframe_points

User-editable keyframes

Type `FCurveKeyframePoints` `bpy_prop_collection` of `Keyframe`, (readonly)

lock

F-Curve's settings cannot be edited

Type boolean, default False

modifiers

Modifiers affecting the shape of the F-Curve

Type `FCurveModifiers` `bpy_prop_collection` of `FModifier`, (readonly)

mute

F-Curve is not evaluated

Type boolean, default False

sampled_points

Sampled animation data

Type `bpy_prop_collection` of `FCurveSample`, (readonly)

select

F-Curve is selected for editing

Type boolean, default False

evaluate (*frame*)

Evaluate F-Curve

Parameters **frame** (*float in [-inf, inf]*) – Frame, Evaluate F-Curve at given frame

Returns Position, F-Curve position

Return type float in [-inf, inf]

range ()

Get the time extents for F-Curve

Returns Range, Min/Max values

Return type float array of 2 items in [-inf, inf]

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.fcurves`
- `ActionFCurves.new`
- `ActionFCurves.remove`
- `ActionGroup.channels`
- `AnimData.drivers`
- `AnimDataDrivers.from_existing`
- `AnimDataDrivers.from_existing`
- `NlaStrip.fcurves`

2.4.219 FCurveKeyframePoints(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.FCurveKeyframePoints` (*bpy_struct*)

Collection of keyframe points

insert (*frame, value, options=set()*)

Add a keyframe point to a F-Curve

Parameters

- **frame** (*float in [-inf, inf]*) – X Value of this keyframe point
- **value** (*float in [-inf, inf]*) – Y Value of this keyframe point
- **options** (*enum set in {'REPLACE', 'NEEDED', 'FAST'}, (optional)*) – Keyframe options
 - REPLACE Replace, Don't add any new keyframes, but just replace existing ones.
 - NEEDED Needed, Only adds keyframes that are needed.
 - FAST Fast, Fast keyframe insertion to avoid recalculating the curve each time.

Returns Newly created keyframe

Return type `Keyframe`

add (*count=1*)

Add a keyframe point to a F-Curve

Parameters **count** (*int in [1, inf], (optional)*) – Number, Number of points to add to the spline

remove (*keyframe, fast=False*)

Remove keyframe from an F-Curve

Parameters

- **keyframe** (*Keyframe, (never None)*) – Keyframe to remove
- **fast** (*boolean, (optional)*) – Fast, Fast keyframe removal to avoid recalculating the curve each time

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.keyframe_points`

2.4.220 FCurveModifiers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.FCurveModifiers` (*bpy_struct*)
Collection of F-Curve Modifiers

active

Active F-Curve Modifier

Type `FModifier`

new (*type*)

Add a constraint to this object

Parameters **type** (*enum in ['NULL', 'GENERATOR', 'FNGENERATOR', 'ENVELOPE', 'CYCLES', 'NOISE', 'FILTER', 'LIMITS', 'STEPPED']*) – Constraint type to add

Returns New fmodifier

Return type `FModifier`

remove (*modifier*)

Remove a modifier from this F-Curve

Parameters **modifier** (`FModifier`, (never None)) – Removed modifier

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.modifiers`

2.4.221 FCurveSample(bpy_struct)

base class — `bpy_struct`

class `bpy.types.FCurveSample` (*bpy_struct*)

Sample point for F-Curve

co

Point coordinates

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`

select

Selection status

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.sampled_points`

2.4.222 FModifier(`bpy_struct`)

base class — `bpy_struct`

subclasses — `FModifierCycles`, `FModifierPython`, `FModifierFunctionGenerator`, `FModifierLimits`, `FModifierEnvelope`, `FModifierNoise`, `FModifierStepped`, `FModifierGenerator`

class `bpy.types.FModifier` (*`bpy_struct`*)

Modifier for values of F-Curve

active

F-Curve Modifier is the one being edited

Type boolean, default False

blend_in

Number of frames from start frame for influence to take effect

Type float in [-inf, inf], default 0.0

blend_out

Number of frames from start frame for influence to fade out

Type float in [-inf, inf], default 0.0

frame_end

Frame that modifier's influence ends (if Restrict Frame Range is in use)

Type float in [-inf, inf], default 0.0

frame_start

Frame that modifier's influence starts (if Restrict Frame Range is in use)

Type float in [-inf, inf], default 0.0

influence

Amount of influence F-Curve Modifier will have when not fading in/out

Type float in [0, 1], default 1.0

is_valid

F-Curve Modifier has invalid settings and will not be evaluated

Type boolean, default False, (readonly)

mute

F-Curve Modifier will not be evaluated

Type boolean, default False

show_expanded

F-Curve Modifier's panel is expanded in UI

Type boolean, default False

type

F-Curve Modifier Type

Type enum in ['NULL', 'GENERATOR', 'FNGENERATOR', 'ENVELOPE', 'CYCLES', 'NOISE', 'FILTER', 'LIMITS', 'STEPPED'], default 'NULL', (readonly)

use_influence

F-Curve Modifier's effects will be tempered by a default factor

Type boolean, default False

use_restricted_range

F-Curve Modifier is only applied for the specified frame range to help mask off effects in order to chain them

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.modifiers`
- `FCurveModifiers.active`
- `FCurveModifiers.new`
- `FCurveModifiers.remove`
- `NlaStrip.modifiers`

2.4.223 FModifierCycles(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierCycles` (*FModifier*)

Repeats the values of the modified F-Curve

`cycles_after`

Maximum number of cycles to allow after last keyframe. (0 = infinite)

Type int in [-32768, 32767], default 0

`cycles_before`

Maximum number of cycles to allow before first keyframe. (0 = infinite)

Type int in [-32768, 32767], default 0

`mode_after`

Cycling mode to use after last keyframe

- `NONE` No Cycles, Don't do anything.
- `REPEAT` Repeat Motion, Repeat keyframe range as-is.
- `REPEAT_OFFSET` Repeat with Offset, Repeat keyframe range, but with offset based on gradient between values.
- `MIRROR` Repeat Mirrored, Alternate between forward and reverse playback of keyframe range.

Type enum in ['NONE', 'REPEAT', 'REPEAT_OFFSET', 'MIRROR'], default 'NONE'

`mode_before`

Cycling mode to use before first keyframe

- `NONE` No Cycles, Don't do anything.
- `REPEAT` Repeat Motion, Repeat keyframe range as-is.

- REPEAT_OFFSET** Repeat with Offset, Repeat keyframe range, but with offset based on gradient between values.
- MIRROR** Repeat Mirrored, Alternate between forward and reverse playback of keyframe range.

Type enum in ['NONE', 'REPEAT', 'REPEAT_OFFSET', 'MIRROR'], default 'NONE'

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.224 FModifierEnvelope(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierEnvelope` (*FModifier*)

Scales the values of the modified F-Curve

control_points

Control points defining the shape of the envelope

Type `bpy_prop_collection` of `FModifierEnvelopeControlPoint`, (readonly)

default_max

Upper distance from Reference Value for 1:1 default influence

Type float in [-inf, inf], default 0.0

default_min

Lower distance from Reference Value for 1:1 default influence

Type float in [-inf, inf], default 0.0

reference_value

Value that envelope's influence is centered around / based on

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.225 FModifierEnvelopeControlPoint(bpy_struct)

base class — `bpy_struct`

class `bpy.types.FModifierEnvelopeControlPoint` (*bpy_struct*)
Control point for envelope F-Modifier

frame

Frame this control-point occurs on

Type float in [-inf, inf], default 0.0

max

Upper bound of envelope at this control-point

Type float in [-inf, inf], default 0.0

min

Lower bound of envelope at this control-point

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FModifierEnvelope.control_points`

2.4.226 FModifierFunctionGenerator(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierFunctionGenerator` (*FModifier*)
Generates values using a Built-In Function

amplitude

Scale factor determining the maximum/minimum values

Type float in [-inf, inf], default 0.0

function_type

Type of built-in function to use

- SIN Sine.
- COS Cosine.
- TAN Tangent.
- SQRT Square Root.
- LN Natural Logarithm.
- SINC Normalised Sine, $\sin(x) / x$.

Type enum in ['SIN', 'COS', 'TAN', 'SQRT', 'LN', 'SINC'], default 'SIN'

phase_multiplier

Scale factor determining the 'speed' of the function

Type float in [-inf, inf], default 0.0

phase_offset

Constant factor to offset time by for function

Type float in [-inf, inf], default 0.0

use_additive

Values generated by this modifier are applied on top of the existing values instead of overwriting them

Type boolean, default False

value_offset

Constant factor to offset values by

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.227 FModifierGenerator(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierGenerator` (*FModifier*)

Deterministically generates values for the modified F-Curve

coefficients

Coefficients for 'x' (starting from lowest power of x^0)

Type float array of 32 items in $[-inf, inf]$, default (0.0, 0.0)

mode

Type of generator to use

Type enum in ['POLYNOMIAL', 'POLYNOMIAL_FACTORISED'], default 'POLYNOMIAL'

poly_order

The highest power of 'x' for this polynomial. (number of coefficients - 1)

Type int in $[-inf, inf]$, default 0

use_additive

Values generated by this modifier are applied on top of the existing values instead of overwriting them

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`

- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.228 FModifierLimits(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierLimits` (*FModifier*)
Limits the time/value ranges of the modified F-Curve

max_x
Highest X value to allow
Type float in [-inf, inf], default 0.0

max_y
Highest Y value to allow
Type float in [-inf, inf], default 0.0

min_x
Lowest X value to allow
Type float in [-inf, inf], default 0.0

min_y
Lowest Y value to allow
Type float in [-inf, inf], default 0.0

use_max_x
Use the maximum X value
Type boolean, default False

use_max_y
Use the maximum Y value
Type boolean, default False

use_min_x

Use the minimum X value

Type boolean, default False**use_min_y**

Use the minimum Y value

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.229 FModifierNoise(FModifier)base classes — `bpy_struct`, `FModifier`**class** `bpy.types.FModifierNoise` (*FModifier*)

Gives randomness to the modified F-Curve

blend_type

Method of modifying the existing F-Curve

Type enum in ['REPLACE', 'ADD', 'SUBTRACT', 'MULTIPLY'], default 'REPLACE'

depth

Amount of fine level detail present in the noise

Type int in [0, 32767], default 0

phase

A random seed for the noise effect

Type float in [-inf, inf], default 0.0

scale

Scaling (in time) of the noise

Type float in [-inf, inf], default 0.0

strength

Amplitude of the noise - the amount that it modifies the underlying curve

Type float in [-inf, inf], default 0.0

Inherited Properties

- bpy_struct.id_data
- FModifier.active
- FModifier.blend_in
- FModifier.blend_out
- FModifier.is_valid
- FModifier.frame_end
- FModifier.show_expanded
- FModifier.influence
- FModifier.mute
- FModifier.use_restricted_range
- FModifier.frame_start
- FModifier.type
- FModifier.use_influence

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.230 FModifierPython(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierPython` (*FModifier*)
 Performs user-defined operation on the modified F-Curve

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.231 FModifierStepped(FModifier)

base classes — `bpy_struct`, `FModifier`

class `bpy.types.FModifierStepped` (*FModifier*)
 Hold each interpolated value from the F-Curve for several frames without changing the timing

frame_end

Frame that modifier's influence ends (if applicable)

Type float in `[-inf, inf]`, default 0.0

frame_offset

Reference number of frames before frames get held (use to get hold for '1-3' vs '5-7' holding patterns)

Type float in [-inf, inf], default 0.0

frame_start

Frame that modifier's influence starts (if applicable)

Type float in [-inf, inf], default 0.0

frame_step

Number of frames to hold each value

Type float in [-inf, inf], default 0.0

use_frame_end

Restrict modifier to only act before its 'end' frame

Type boolean, default False

use_frame_start

Restrict modifier to only act after its 'start' frame

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.blend_in`
- `FModifier.blend_out`
- `FModifier.is_valid`
- `FModifier.frame_end`
- `FModifier.show_expanded`
- `FModifier.influence`
- `FModifier.mute`
- `FModifier.use_restricted_range`
- `FModifier.frame_start`
- `FModifier.type`
- `FModifier.use_influence`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.232 FieldSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.FieldSettings` (*bpy_struct*)
Field settings for an object in physics simulation

apply_to_location

Effect particles' location

Type boolean, default False

apply_to_rotation

Effect particles' dynamic rotation

Type boolean, default False

distance_max

Maximum distance for the field to work

Type float in [0, 1000], default 0.0

distance_min

Minimum distance for the field's fall-off

Type float in [0, 1000], default 0.0

falloff_power

Falloff power (real gravitational falloff = 2)

Type float in [0, 10], default 0.0

falloff_type

Type enum in ['SPHERE', 'TUBE', 'CONE'], default 'SPHERE'

flow

Convert effector force into air flow velocity

Type float in [0, 10], default 0.0

guide_clump_amount

Amount of clumping

Type float in [-1, 1], default 0.0

guide_clump_shape

Shape of clumping

Type float in [-0.999, 0.999], default 0.0

guide_free

Guide-free time from particle life's end

Type float in [0, 0.99], default 0.0

guide_kink_amplitude

The amplitude of the offset

Type float in [0, 10], default 0.0

guide_kink_axis

Which axis to use for offset

Type enum in ['X', 'Y', 'Z'], default 'X'

guide_kink_frequency

The frequency of the offset (1/total length)

Type float in [0, 10], default 0.0

guide_kink_shape

Adjust the offset to the beginning/end

Type float in [-0.999, 0.999], default 0.0

guide_kink_type

Type of periodic offset on the curve

Type enum in ['NONE', 'CURL', 'RADIAL', 'WAVE', 'BRAID', 'ROTATION', 'ROLL'], default 'NONE'

guide_minimum

The distance from which particles are affected fully

Type float in [0, 1000], default 0.0

harmonic_damping

Damping of the harmonic force

Type float in [0, 10], default 0.0

inflow

Inwards component of the vortex force

Type float in [-10, 10], default 0.0

linear_drag

Drag component proportional to velocity

Type float in [-2, 2], default 0.0

noise

Amount of noise for the force strength

Type float in [0, 10], default 0.0

quadratic_drag

Drag component proportional to the square of velocity

Type float in [-2, 2], default 0.0

radial_falloff

Radial falloff power (real gravitational falloff = 2)

Type float in [0, 10], default 0.0

radial_max

Maximum radial distance for the field to work

Type float in [0, 1000], default 0.0

radial_min

Minimum radial distance for the field's fall-off

Type float in [0, 1000], default 0.0

rest_length

Rest length of the harmonic force

Type float in [0, 1000], default 0.0

seed

Seed of the noise

Type int in [1, 128], default 0

shape

Which direction is used to calculate the effector force

Type enum in ['POINT', 'PLANE', 'SURFACE', 'POINTS'], default 'POINT'

size

Size of the turbulence

Type float in [0, 10], default 0.0

strength

Strength of force field

Type float in [-1000, 1000], default 0.0

texture

Texture to use as force

Type [Texture](#)

texture_mode

How the texture effect is calculated (RGB & Curl need a RGB texture, else Gradient will be used instead)

Type enum in ['RGB', 'GRADIENT', 'CURL'], default 'RGB'

texture_nabla

Defines size of derivative offset used for calculating gradient and curl

Type float in [0.0001, 1], default 0.0

type

Type of field

- NONE None.
- FORCE Force, Radial field toward the center of object.
- WIND Wind, Constant force along the force object's local Z axis.
- VORTEX Vortex, Spiraling force that twists the force object's local Z axis.
- MAGNET Magnetic, Forcefield depends on the speed of the particles.
- HARMONIC Harmonic, The source of this force field is the zero point of a harmonic oscillator.
- CHARGE Charge, Spherical forcefield based on the charge of particles, only influences other charge force fields.
- LENNARDJ Lennard-Jones, Forcefield based on the Lennard-Jones potential.
- TEXTURE Texture, Forcefield based on a texture.
- GUIDE Curve Guide, Create a force along a curve object.
- BOID Boid.
- TURBULENCE Turbulence, Create turbulence with a noise field.

- DRAG Drag, Create a force that dampens motion.

Type enum in ['NONE', 'FORCE', 'WIND', 'VORTEX', 'MAGNET', 'HARMONIC', 'CHARGE', 'LENNARDJ', 'TEXTURE', 'GUIDE', 'BOID', 'TURBULENCE', 'DRAG'], default 'NONE'

use_2d_force

Apply force only in 2d

Type boolean, default False

use_absorption

Force gets absorbed by collision objects

Type boolean, default False

use_global_coords

Use effector/global coordinates for turbulence

Type boolean, default False

use_guide_path_add

Based on distance/falloff it adds a portion of the entire path

Type boolean, default False

use_guide_path_weight

Use curve weights to influence the particle influence along the curve

Type boolean, default False

use_max_distance

Use a maximum distance for the field to work

Type boolean, default False

use_min_distance

Use a minimum distance for the field's fall-off

Type boolean, default False

use_multiple_springs

Every point is effected by multiple springs

Type boolean, default False

use_object_coords

Use object/global coordinates for texture

Type boolean, default False

use_radial_max

Use a maximum radial distance for the field to work

Type boolean, default False

use_radial_min

Use a minimum radial distance for the field's fall-off

Type boolean, default False

use_root_coords

Texture coordinates from root particle locations

Type boolean, default False

z_direction

Effect in full or only positive/negative Z direction

Type enum in ['BOTH', 'POSITIVE', 'NEGATIVE'], default 'BOTH'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.field`
- `ParticleSystem.force_field_1`
- `ParticleSystem.force_field_2`

2.4.233 FileSelectParams(bpy_struct)

base class — `bpy_struct`

class `bpy.types.FileSelectParams` (*bpy_struct*)

File Select Parameters

directory

Directory displayed in the file browser

Type string, default ""

display_type

Display mode for the file list

- `FILE_SHORTDISPLAY` Short List, Display files as short list.
- `FILE_LONGDISPLAY` Long List, Display files as a detailed list.
- `FILE_IMGDISPLAY` Thumbnails, Display files as thumbnails.

Type enum in ['FILE_SHORTDISPLAY', 'FILE_LONGDISPLAY', 'FILE_IMGDISPLAY'], default 'FILE_SHORTDISPLAY'

filename

Active file in the file browser

Type string, default ""

filter_glob

Type string, default ""

show_hidden

Show hidden dot files

Type boolean, default False

sort_method

- FILE_SORT_ALPHA Sort alphabetically, Sort the file list alphabetically.
- FILE_SORT_EXTENSION Sort by extension, Sort the file list by extension.
- FILE_SORT_TIME Sort by time, Sort files by modification time.
- FILE_SORT_SIZE Sort by size, Sort files by size.

Type enum in ['FILE_SORT_ALPHA', 'FILE_SORT_EXTENSION', 'FILE_SORT_TIME', 'FILE_SORT_SIZE'], default 'FILE_SORT_ALPHA'

title

Title for the file browser

Type string, default "", (readonly)

use_filter

Enable filtering of files

Type boolean, default False

use_filter_blender

Show .blend files

Type boolean, default False

use_filter_folder

Show folders

Type boolean, default False

use_filter_font

Show font files

Type boolean, default False

use_filter_image

Show image files

Type boolean, default False

use_filter_movie

Show movie files

Type boolean, default False

use_filter_script

Show script files

Type boolean, default False**use_filter_sound**

Show sound files

Type boolean, default False**use_filter_text**

Show text files

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceFileBrowser.params`

2.4.234 Filter2DActuator(Actuator)base classes — `bpy_struct`, `Actuator`

class `bpy.types.Filter2DActuator` (*Actuator*)
Actuator to apply screen graphic effects

filter_pass

Set filter order

Type int in [0, 99], default 0**glsl_shader**

Type Text

mode

Type enum in ['ENABLE', 'DISABLE', 'REMOVE', 'MOTIONBLUR', 'BLUR', 'SHARPEN', 'DILATION', 'EROSION', 'LAPLACIAN', 'SOBEL', 'PREWITT', 'GRAYSCALE', 'SEPIA', 'INVERT', 'CUSTOMFILTER'], default 'REMOVE'

motion_blur_factor

Motion blur factor

Type float in [0, 1], default 0.0

use_motion_blur

Enable/Disable Motion Blur

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.235 FloatProperties(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.FloatProperties` (*bpy_struct*)
Collection of float properties

new (*name*="Float Prop")

Add a float property layer to Mesh

Parameters *name* (*string*, (*optional*)) – Float property name

Returns The newly created layer

Return type `MeshFloatPropertyLayer`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.layers_float`

2.4.236 FloatProperty(Property)

base classes — `bpy_struct`, `Property`

class `bpy.types.FloatProperty` (`Property`)
RNA floating pointer number property definition

array_length

Maximum length of the array, 0 means unlimited

Type `int` in `[0, inf]`, default 0, (readonly)

default

Default value for this number

Type `float` in `[-inf, inf]`, default 0.0, (readonly)

default_array

Default value for this array

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0), (readonly)

hard_max

Maximum value used by buttons

Type float in [-inf, inf], default 0.0, (readonly)

hard_min

Minimum value used by buttons

Type float in [-inf, inf], default 0.0, (readonly)

precision

Number of digits after the dot used by buttons

Type int in [0, inf], default 0, (readonly)

soft_max

Maximum value used by buttons

Type float in [-inf, inf], default 0.0, (readonly)

soft_min

Minimum value used by buttons

Type float in [-inf, inf], default 0.0, (readonly)

step

Step size used by number buttons, for floats 1/100th of the step size

Type float in [0, inf], default 0.0, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.237 FloorConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.FloorConstraint` (*Constraint*)

Uses the target object for location limitation

floor_location

Location of target that object will not pass through

Type enum in ['FLOOR_X', 'FLOOR_Y', 'FLOOR_Z', 'FLOOR_NEGATIVE_X', 'FLOOR_NEGATIVE_Y', 'FLOOR_NEGATIVE_Z'], default 'FLOOR_X'

offset

Offset of floor from object origin

Type float in [0, 100], default 0.0

subtarget

Type string, default ""

target

Target Object

Type `Object`

use_rotation

Use the target's rotation to determine floor

Type boolean, default False

use_sticky

Immobilize object while constrained

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`

- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.238 FluidFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.FluidFluidSettings` (*FluidSettings*)

Fluid simulation settings for the fluid in the simulation

initial_velocity

Initial velocity of fluid

Type float array of 3 items in [-1000.1, 1000.1], default (0.0, 0.0, 0.0)

use

Object contributes to the fluid simulation

Type boolean, default False

use_animated_mesh

Export this mesh as an animated one. Slower, only use if really necessary (e.g. armatures or parented objects), animated pos/rot/scale IPOs do not require it

Type boolean, default False

volume_initialization

Volume initialization type

- **VOLUME** Volume, Use only the inner volume of the mesh.
- **SHELL** Shell, Use only the outer shell of the mesh.

- BOTH Both, Use both the inner volume and the outer shell of the mesh.

Type enum in ['VOLUME', 'SHELL', 'BOTH'], default 'VOLUME'

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.239 FluidMeshVertex(bpy_struct)

base class — `bpy_struct`

class `bpy.types.FluidMeshVertex` (*bpy_struct*)
Vertex of a simulated fluid mesh

velocity

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0), (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DomainFluidSettings.fluid_mesh_vertices`

2.4.240 FluidSettings(bpy_struct)

base class — `bpy_struct`

subclasses — `FluidFluidSettings`, `DomainFluidSettings`, `ControlFluidSettings`,
`InflowFluidSettings`, `ObstacleFluidSettings`, `ParticleFluidSettings`,
`OutflowFluidSettings`

class `bpy.types.FluidSettings` (*bpy_struct*)

Fluid simulation settings for an object taking part in the simulation

type

Type of participation in the fluid simulation

- **NONE** None.
- **DOMAIN** Domain, Bounding box of this object represents the computational domain of the fluid simulation.
- **FLUID** Fluid, Object represents a volume of fluid in the simulation.
- **OBSTACLE** Obstacle, Object is a fixed obstacle.
- **INFLOW** Inflow, Object adds fluid to the simulation.
- **OUTFLOW** Outflow, Object removes fluid from the simulation.
- **PARTICLE** Particle, Object is made a particle system to display particles generated by a fluidsim domain object.
- **CONTROL** Control, Object is made a fluid control mesh, which influences the fluid.

Type enum in ['NONE', 'DOMAIN', 'FLUID', 'OBSTACLE', 'INFLOW', 'OUTFLOW', 'PARTICLE', 'CONTROL'], default 'NONE'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FluidSimulationModifier.settings`

2.4.241 FluidSimulationModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.FluidSimulationModifier` (*Modifier*)
Fluid simulation modifier

settings

Settings for how this object is used in the fluid simulation

Type `FluidSettings`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.242 FollowPathConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.FollowPathConstraint` (*Constraint*)

Locks motion to the target path

forward_axis

Axis that points forward along the path

Type enum in ['FORWARD_X', 'FORWARD_Y', 'FORWARD_Z', 'TRACK_NEGATIVE_X', 'TRACK_NEGATIVE_Y', 'TRACK_NEGATIVE_Z'], default 'FORWARD_X'

offset

Offset from the position corresponding to the time frame

Type float in [-300000, 300000], default 0.0

offset_factor

Percentage value defining target position along length of bone

Type float in [0, 1], default 0.0

target

Target Object

Type `Object`

up_axis

Axis that points upward

Type enum in ['UP_X', 'UP_Y', 'UP_Z'], default 'UP_X'

use_curve_follow

Object will follow the heading and banking of the curve

Type boolean, default False

use_curve_radius

Objects scale by the curve radius

Type boolean, default False

use_fixed_location

Object will stay locked to a single point somewhere along the length of the curve regardless of time

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.243 FollowTrackConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.FollowTrackConstraint` (*Constraint*)

Locks motion to the target motion track

clip

Movie Clip to get tracking data from

Type `MovieClip`

track

Movie tracking track to follow

Type string, default ""

use_3d_position

Use 3D position of track to parent to

Type boolean, default False

use_active_clip

Use active clip defined in scene

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.244 Function(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Function` (*bpy_struct*)
RNA function definition

description

Description of the Function's purpose

Type string, default "", (readonly)

identifier

Unique name used in the code and scripting

Type string, default "", (readonly)

is_registered

Function is registered as callback as part of type registration

Type boolean, default False, (readonly)

is_registered_optional

Function is optionally registered as callback part of type registration

Type boolean, default False, (readonly)

parameters

Parameters for the function

Type `bpy_prop_collection` of `Property`, (readonly)

use_self

Function does not pass its self as an argument (becomes a class method in python)

Type boolean, default False, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Struct.functions`

2.4.245 GPencilFrame(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.GPencilFrame` (*bpy_struct*)
Collection of related sketches on a particular frame

frame_number
The frame on which this sketch appears
Type int in [0, 300000], default 0

is_edited
Frame is being edited (painted on)
Type boolean, default False

select
Frame is selected for editing in the DopeSheet
Type boolean, default False

strokes
Freehand curves defining the sketch on this frame
Type `bpy_prop_collection` of `GPencilStroke`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GPencilLayer.active_frame`
- `GPencilLayer.frames`

2.4.246 GPencilLayer(*bpy_struct*)

base class — `bpy_struct`

```

class bpy.types.GPencilLayer (bpy_struct)
    Collection of related sketches

    active_frame
        Frame currently being displayed for this layer
        Type GPencilFrame, (readonly)

    alpha
        Layer Opacity
        Type float in [0.3, 1], default 0.0

    color
        Color for all strokes in this layer
        Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

    frames
        Sketches for this layer on different frames
        Type bpy_prop_collection of GPencilFrame, (readonly)

    ghost_range_max
        Maximum number of frames on either side of the active frame to show (0 = show the 'first' available sketch
        on either side)
        Type int in [0, 120], default 0

    hide
        Set layer Visibility
        Type boolean, default False

    info
        Layer name
        Type string, default ""

    line_width
        Thickness of strokes (in pixels)
        Type int in [1, 10], default 0

    lock
        Protect layer from further editing and/or frame changes
        Type boolean, default False

    lock_frame
        Lock current frame displayed by layer
        Type boolean, default False

    select
        Layer is selected for editing in the DopeSheet
        Type boolean, default False

    show_points
        Draw the points which make up the strokes (for debugging purposes)
        Type boolean, default False

    show_x_ray
        Type boolean, default False

```

use_onion_skinning

Ghost frames on either side of frame

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GreasePencil.layers`

2.4.247 GPencilStroke(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.GPencilStroke` (*bpy_struct*)

Freehand curve defining part of a sketch

points

Stroke data points

Type `bpy_prop_collection` of `GPencilStrokePoint`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GPencilFrame.strokes`

2.4.248 GPencilStrokePoint(bpy_struct)

base class — `bpy_struct`

class `bpy.types.GPencilStrokePoint` (*bpy_struct*)

Data point for freehand stroke curve

co

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

pressure

Pressure of tablet at point when drawing it

Type float in `[0, 1]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GPencilStroke.points`

2.4.249 GameActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.GameActuator` (*Actuator*)

filename

Load this blend file, use the “/” prefix for a path relative to the current blend file

Type string, default “”

mode

Type enum in ['START', 'RESTART', 'QUIT', 'SAVECFG', 'LOADCFG'], default 'START'

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.250 GameBooleanProperty(GameProperty)

base classes — `bpy_struct`, `GameProperty`

class `bpy.types.GameBooleanProperty` (*GameProperty*)

Game engine user defined Boolean property

value

Property value

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `GameProperty.name`
- `GameProperty.show_debug`
- `GameProperty.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.251 GameFloatProperty(GameProperty)

base classes — `bpy_struct`, `GameProperty`

class `bpy.types.GameFloatProperty` (*GameProperty*)

Game engine user defined floating pointer number property

value

Property value

Type float in [-10000, 10000], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `GameProperty.name`
- `GameProperty.show_debug`
- `GameProperty.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.252 GameIntProperty(GameProperty)

base classes — `bpy_struct`, `GameProperty`

class `bpy.types.GameIntProperty` (*GameProperty*)
Game engine user defined integer number property

value
Property value

Type int in [-10000, 10000], default 0

Inherited Properties

- `bpy_struct.id_data`
- `GameProperty.name`
- `GameProperty.show_debug`
- `GameProperty.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.253 `GameObjectSettings(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.GameObjectSettings` (*bpy_struct*)

Game engine related settings for the object

actuators

Game engine actuators to act on events

Type `bpy_prop_collection` of `Actuator`, (readonly)

collision_bounds_type

Select the collision type

Type enum in ['BOX', 'SPHERE', 'CYLINDER', 'CONE', 'CONVEX_HULL', 'TRIANGLE_MESH', 'CAPSULE'], default 'BOX'

collision_margin

Extra margin around object for collision detection, small amount required for stability

Type float in [0, 1], default 0.0

controllers

Game engine controllers to process events, connecting sensors to actuators

Type `bpy_prop_collection` of `Controller`, (readonly)

damping

General movement damping

Type float in [0, 1], default 0.0

form_factor

Form factor scales the inertia tensor

Type float in [0, 1], default 0.0

friction_coefficients

Relative friction coefficients in the in the X, Y and Z directions, when anisotropic friction is enabled

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

lock_location_x

Disable simulation of linear motion along the X axis

Type boolean, default False

lock_location_y

Disable simulation of linear motion along the Y axis

Type boolean, default False

lock_location_z

Disable simulation of linear motion along the Z axis

Type boolean, default False

lock_rotation_x

Disable simulation of angular motion along the X axis

Type boolean, default False

lock_rotation_y

Disable simulation of angular motion along the Y axis

Type boolean, default False

lock_rotation_z

Disable simulation of angular motion along the Z axis

Type boolean, default False

mass

Mass of the object

Type float in [0.01, 10000], default 0.0

obstacle_radius

Radius of object representation in obstacle simulation

Type float in [0, 1000], default 0.0

physics_type

Select the type of physical representation

- NO_COLLISION No Collision, Disable collision for this object.
- STATIC Static, Stationary object.
- DYNAMIC Dynamic, Linear physics.
- RIGID_BODY Rigid Body, Linear and angular physics.
- SOFT_BODY Soft Body, Soft body.
- OCCLUDE Occlude, Occluder for optimizing scene rendering.
- SENSOR Sensor, Collision Sensor, detects static and dynamic objects but not the other collision sensor objects.
- NAVMESH Navigation Mesh, Navigation mesh.

Type enum in ['NO_COLLISION', 'STATIC', 'DYNAMIC', 'RIGID_BODY', 'SOFT_BODY', 'OCCLUDE', 'SENSOR', 'NAVMESH'], default 'NO_COLLISION'

properties

Game engine properties

Type bpy_prop_collection of GameProperty, (readonly)

radius

Radius of bounding sphere and material physics

Type float in [0.01, 10], default 0.0

rotation_damping

General rotation damping

Type float in [0, 1], default 0.0

sensors

Game engine sensor to detect events

Type `bpy_prop_collection` of `Sensor`, (readonly)

show_actuators

Shows actuators for this object in the user interface

Type boolean, default False

show_controllers

Shows controllers for this object in the user interface

Type boolean, default False

show_debug_state

Print state debug info in the game engine

Type boolean, default False

show_sensors

Shows sensors for this object in the user interface

Type boolean, default False

show_state_panel

Show state panel

Type boolean, default False

soft_body

Settings for Bullet soft body simulation

Type `GameSoftBodySettings`, (readonly)

states_initial

Initial state when the game starts

Type boolean array of 30 items, default (False, False)

states_visible

State determining which controllers are displayed

Type boolean array of 30 items, default (False, False)

use_activity_culling

Disable simulation of angular motion along the Z axis

Type boolean, default False

use_actor

Object is detected by the Near and Radar sensor

Type boolean, default False

use_all_states

Set all state bits

Type boolean, default False

use_anisotropic_friction

Enable anisotropic friction

Type boolean, default False

use_collision_bounds

Specify a collision bounds type other than the default

Type boolean, default False

use_collision_compound

Add children to form a compound collision object

Type boolean, default False

use_ghost

Object does not retribute collisions, like a ghost

Type boolean, default False

use_material_physics_fh

React to force field physics settings in materials

Type boolean, default False

use_obstacle_create

Create representation for obstacle simulation

Type boolean, default False

use_rotate_from_normal

Use face normal to rotate object, so that it points away from the surface

Type boolean, default False

use_sleep

Disable auto (de)activation in physics simulation

Type boolean, default False

used_states

States which are being used by controllers

Type boolean array of 30 items, default (False, False), (readonly)

velocity_max

Clamp velocity to this maximum speed

Type float in [0, 1000], default 0.0

velocity_min

Clamp velocity to this minimum speed (except when totally still)

Type float in [0, 1000], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.game`

2.4.254 GameProperty(bpy_struct)

base class — `bpy_struct`

subclasses — `GameStringProperty`, `GameIntProperty`, `GameBooleanProperty`, `GameFloatProperty`, `GameTimerProperty`

class `bpy.types.GameProperty` (*bpy_struct*)
Game engine user defined object property

name

Available as `GameObject` attributes in the game engine's python API

Type string, default ""

show_debug

Print debug information for this property

Type boolean, default False

type

- `BOOL` Boolean, Boolean Property.
- `INT` Integer, Integer Property.
- `FLOAT` Float, Floating-Point Property.
- `STRING` String, String Property.

- TIMER Timer, Timer Property.

Type enum in ['BOOL', 'INT', 'FLOAT', 'STRING', 'TIMER'], default 'BOOL'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GameObjectSettings.properties`

2.4.255 GameSoftBodySettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.GameSoftBodySettings` (*bpy_struct*)
Soft body simulation settings for an object in the game engine

cluster_iterations

Number of cluster iterations

Type int in [1, 128], default 0

collision_margin

Collision margin for soft body. Small value makes the algorithm unstable

Type float in [0.01, 1], default 0.0

dynamic_friction

Dynamic Friction

Type float in [0, 1], default 0.0

linear_stiffness

Linear stiffness of the soft body links

Type float in [0, 1], default 0.0

location_iterations

Position solver iterations

Type int in [0, 10], default 0

shape_threshold

Shape matching threshold

Type float in [0, 1], default 0.0

use_bending_constraints

Enable bending constraints

Type boolean, default False

use_cluster_rigid_to_softbody

Enable cluster collision between soft and rigid body

Type boolean, default False

use_cluster_soft_to_softbody

Enable cluster collision between soft and soft body

Type boolean, default False

use_shape_match

Enable soft body shape matching goal

Type boolean, default False

weld_threshold

Welding threshold: distance between nearby vertices to be considered equal => set to 0.0 to disable welding test and speed up scene loading (ok if the mesh has no duplicates)

Type float in [0, 0.01], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GameObjectSettings.soft_body`

2.4.256 GameStringProperty(GameProperty)

base classes — `bpy_struct`, `GameProperty`

class `bpy.types.GameStringProperty` (*GameProperty*)
Game engine user defined text string property

value

Property value

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `GameProperty.name`
- `GameProperty.show_debug`
- `GameProperty.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.257 GameTimerProperty(GameProperty)

base classes — `bpy_struct`, `GameProperty`

class `bpy.types.GameTimerProperty` (*GameProperty*)
Game engine user defined timer property

value

Property value

Type float in [-10000, 10000], default 0.0**Inherited Properties**

- `bpy_struct.id_data`
- `GameProperty.name`
- `GameProperty.show_debug`
- `GameProperty.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.258 GlowSequence(EffectSequence)base classes — `bpy_struct`, `Sequence`, `EffectSequence`**class** `bpy.types.GlowSequence` (*EffectSequence*)

Sequence strip creating a glow effect

blur_radius

Radius of glow effect

Type float in [0.5, 20], default 0.0**boost_factor**

Brightness multiplier

Type float in [0, 10], default 0.0**clamp**

rightness limit of intensity

Type float in [0, 1], default 0.0**quality**

Accuracy of the blur effect

Type int in [1, 5], default 0

threshold

Minimum intensity to trigger a glow

Type float in [0, 1], default 0.0

use_only_boost

Show the glow buffer only

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`
- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`

- `EffectSequence.strobe`
- `EffectSequence.transform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.259 GreasePencil(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.GreasePencil` (*ID*)

Freehand annotation sketchbook

draw_mode

- `CURSOR` Cursor, Draw stroke at the 3D cursor.
- `VIEW` View, Stick stroke to the view .
- `SURFACE` Surface, Stick stroke to surfaces.
- `STROKE` Stroke, Stick stroke to other strokes.

Type enum in [`'CURSOR'`, `'VIEW'`, `'SURFACE'`, `'STROKE'`], default `'VIEW'`

layers

Type `GreasePencilLayers` `bpy_prop_collection` of `GPencilLayer`, (readonly)

use_stroke_endpoints

Only use the first and last parts of the stroke for snapping

Type boolean, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.grease_pencil`
- `GreasePencilLayers.active`
- `MovieClip.grease_pencil`
- `NodeTree.grease_pencil`
- `Object.grease_pencil`
- `Scene.grease_pencil`
- `SpaceImageEditor.grease_pencil`

2.4.260 GreasePencilLayers(bpy_struct)

base class — `bpy_struct`

class `bpy.types.GreasePencilLayers` (*bpy_struct*)
Collection of grease pencil layers

active

Active grease pencil layer

Type `GreasePencil`**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GreasePencil.layers`

2.4.261 Group(ID)base classes — `bpy_struct`, `ID`**class** `bpy.types.Group` (*ID*)

Group of Object datablocks

dupli_offset

Offset from the origin to use when instancing as DupliGroup

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`**layers**

Layers visible when this groups is instanced as a dupli

Type boolean array of 20 items, default `(False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)`**objects**

A collection of this groups objects

Type `GroupObjects` `bpy_prop_collection` of `Object`, (readonly)

users_dupli_group

The dupli group this group is used in (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.groups`
- `BlendDataGroups.new`
- `BlendDataGroups.remove`
- `ClothCollisionSettings.group`
- `DopeSheet.filter_group`
- `DynamicPaintSurface.brush_group`
- `EffectorWeights.group`
- `Material.light_group`
- `Object.dupli_group`
- `ParticleSettings.dupli_group`
- `RenderLayer.light_override`

- `SceneRenderLayer.light_override`
- `SmokeDomainSettings.collision_group`
- `SmokeDomainSettings.effector_group`
- `SmokeDomainSettings.fluid_group`

2.4.262 GroupInputs(bpy_struct)

base class — `bpy_struct`

class `bpy.types.GroupInputs` (*bpy_struct*)

Collection of group sockets

new (*name="Socket", type='VALUE'*)

Add a socket to the group tree

Parameters

- **name** (*string, (optional)*) – Name, Name of the socket
- **type** (*enum in ['VALUE', 'VECTOR', 'RGBA'], (optional)*) – Type, Type of socket

Returns New socket

Return type `NodeSocket`

expose (*sock=None, add_link=True*)

Expose an internal socket in the group tree

Parameters

- **sock** (`NodeSocket`, (*optional*)) – Socket, Internal node socket to expose
- **add_link** (*boolean, (optional)*) – Add Link, If TRUE, adds a link to the internal socket

Returns New socket

Return type `NodeSocket`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NodeTree.inputs`

2.4.263 GroupObjects(bpy_struct)

base class — `bpy_struct`

class `bpy.types.GroupObjects` (*bpy_struct*)

Collection of group objects

link (*object*)

Add this object to a group

Parameters `object` (`Object`, (never `None`)) – Object to add

unlink (*object*)

Remove this object to a group

Parameters `object` (`Object`) – Object to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Group.objects`

2.4.264 GroupOutputs(bpy_struct)

base class — `bpy_struct`

class `bpy.types.GroupOutputs` (*bpy_struct*)

Collection of group sockets

new (*name*="Socket", *type*='VALUE')

Add a socket to the group tree

Parameters

- **name** (*string, (optional)*) – Name, Name of the socket
- **type** (*enum in ['VALUE', 'VECTOR', 'RGBA'], (optional)*) – Type, Type of socket

Returns New socket

Return type `NodeSocket`

expose (*sock*=None, *add_link*=True)

Expose an internal socket in the group tree

Parameters

- **sock** (`NodeSocket`, (*optional*)) – Socket, Internal node socket to expose
- **add_link** (*boolean, (optional)*) – Add Link, If TRUE, adds a link to the internal socket

Returns New socket

Return type `NodeSocket`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NodeTree.outputs`

2.4.265 Header(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Header` (*bpy_struct*)
Editor header containing UI elements

bl_idname

If this is set, the header gets a custom ID, otherwise it takes the name of the class used to define the panel; for example, if the class name is “OBJECT_HT_hello”, and `bl_idname` is not set by the script, then `bl_idname` = “OBJECT_HT_hello”

Type string, default “”

bl_space_type

The space where the header is going to be used in

Type enum in ['EMPTY', 'VIEW_3D', 'GRAPH_EDITOR', 'OUTLINER', 'PROPERTIES', 'FILE_BROWSER', 'IMAGE_EDITOR', 'INFO', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'DOPE SHEET_EDITOR', 'NLA_EDITOR', 'TIMELINE', 'NODE_EDITOR', 'LOGIC_EDITOR', 'CONSOLE', 'USER_PREFERENCES', 'CLIP_EDITOR'], default 'EMPTY'

layout

Structure of the header in the UI

Type `UILayout`, (readonly)

draw (*context*)

Draw UI elements into the header UI layout

classmethod `append` (*draw_func*)

Append a draw function to this menu, takes the same arguments as the menu draw function

classmethod `prepend` (*draw_func*)

Prepend a draw function to this menu, takes the same arguments as the menu draw function

classmethod `remove` (*draw_func*)

Remove a draw function that has been added to this menu

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.266 HemiLamp(Lamp)

base classes — `bpy_struct`, `ID`, `Lamp`

class `bpy.types.HemiLamp` (*Lamp*)
180 degree constant lamp

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Lamp.active_texture`
- `Lamp.active_texture_index`
- `Lamp.animation_data`
- `Lamp.color`
- `Lamp.use_diffuse`
- `Lamp.distance`
- `Lamp.energy`
- `Lamp.use_own_layer`
- `Lamp.use_negative`
- `Lamp.node_tree`
- `Lamp.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`
- `Lamp.use_nodes`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.267 Histogram(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Histogram` (*bpy_struct*)

Statistical view of the levels of color in an image

mode

Channels to display when drawing the histogram

Type enum in ['LUMA', 'RGB', 'R', 'G', 'B'], default 'LUMA'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scopes.histogram`
- `SpaceImageEditor.sample_histogram`

2.4.268 HookModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.HookModifier` (*Modifier*)

Hook modifier to modify the location of vertices

falloff

If not zero, the distance from the hook where influence ends

Type float in [0, inf], default 0.0

force

Relative force of the hook

Type float in [0, 1], default 0.0

object

Parent Object for hook, also recalculates and clears offset

Type `Object`

subtarget

Name of Parent Bone for hook (if applicable), also recalculates and clears offset

Type string, default ""

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.269 ID(`bpy_struct`)

base class — `bpy_struct`

subclasses — `Lattice`, `Library`, `Key`, `MetaBall`, `NodeTree`, `Text`, `World`, `Lamp`, `Brush`, `Object`, `Armature`, `Mesh`, `VectorFont`, `GreasePencil`, `Sound`, `ParticleSettings`, `Scene`, `WindowManager`, `Texture`, `Curve`, `Action`, `Group`, `Screen`, `Speaker`, `Material`, `Image`, `MovieClip`, `Camera`

class `bpy.types.ID` (*`bpy_struct`*)

Base type for datablocks, defining a unique name, linking from other libraries and garbage collection

`is_updated`

Datablock is tagged for recalculation

Type boolean, default False, (readonly)

`is_updated_data`

Datablock data is tagged for recalculation

Type boolean, default False, (readonly)

`library`

Library file the datablock is linked from

Type `Library`, (readonly)

`name`

Unique datablock ID name

Type string, default ""

`tag`

Tools can use this to tag data (initial state is undefined)

Type boolean, default False

`use_fake_user`

Save this datablock even if it has no users

Type boolean, default False

`users`

Number of times this datablock is referenced

Type int in [0, 32767], default 0, (readonly)

`copy()`

Create a copy of this datablock (not supported for all datablocks)

Returns New copy of the ID

Return type ID

user_clear()

Clear the user count of a datablock so its not saved, on reload the data will be removed

This function is for advanced use only, misuse can crash blender since the user count is used to prevent data being removed when it is used.

```
# This example shows what _not_ to do, and will crash blender.
import bpy

# object which is in the scene.
obj = bpy.data.objects["Cube"]

# without this, removal would raise an error.
obj.user_clear()

# runs without an exception
# but will crash on redraw.
bpy.data.objects.remove(obj)
```

animation_data_create()

Create animation data to this ID, note that not all ID types support this

Returns New animation data or NULL

Return type AnimData

animation_data_clear()

Clear animation on this this ID

update_tag (refresh=set())

Tag the ID to update its display data

Parameters **refresh** (*enum set in {'OBJECT', 'DATA', 'TIME'}, (optional)*) – Type of updates to perform

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlendData.scripts`
- `BlendDataObjects.new`
- `DopeSheet.source`
- `DriverTarget.id`
- `ID.copy`
- `Key.user`
- `KeyingSetPath.id`
- `KeyingSetPaths.add`
- `Object.data`
- `SpaceNodeEditor.id`
- `SpaceNodeEditor.id_from`
- `SpaceProperties.pin_id`
- `UILayout.template_path_builder`
- `UILayout.template_preview`
- `UILayout.template_preview`

2.4.270 IDMaterials(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.IDMaterials` (*bpy_struct*)
Collection of materials

append (*material*)

Add a new material to the data block

Parameters **material** (`Material`) – Material to add

pop (*index*, *update_data=False*)

Remove a material from the data block

Parameters

- **index** (*int in [0, 32766]*) – Index of material to remove
- **update_data** (*boolean, (optional)*) – Update data by re-adjusting the material slots assigned

Returns Material to remove

Return type `Material`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Curve.materials`
- `Mesh.materials`
- `MetaBall.materials`

2.4.271 IKParam(bpy_struct)

base class — `bpy_struct`

subclasses — `Itasc`

class `bpy.types.IKParam` (*bpy_struct*)

Base type for IK solver parameters

ik_solver

IK solver for which these parameters are defined, 0 for Legacy, 1 for iTaSC

- **LEGACY** Legacy, Original IK solver.
- **ITASC** iTaSC, Multi constraint, stateful IK solver.

Type enum in ['LEGACY', 'ITASC'], default 'LEGACY', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Pose.ik_param`

2.4.272 Image(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Image` (*ID*)

Image datablock referencing an external or packed image

bindcode

OpenGL bindcode

Type `int` in `[0, inf]`, default `0`, (readonly)

depth

Image bit depth

Type `int` in `[0, inf]`, default `0`, (readonly)

display_aspect

Display Aspect for this image, does not affect rendering

Type `float` array of 2 items in `[0.1, 5000]`, default `(0.0, 0.0)`

field_order

Order of video fields. Select which lines are displayed first

- `EVEN` Upper First, Upper field first.
- `ODD` Lower First, Lower field first.

Type `enum` in `['EVEN', 'ODD']`, default `'EVEN'`

file_format

Format used for re-saving this file

- `BMP` `BMP`, Output image in bitmap format.
- `IRIS` `Iris`, Output image in (old!) `SGI IRIS` format.
- `PNG` `PNG`, Output image in `PNG` format.
- `JPEG` `JPEG`, Output image in `JPEG` format.
- `TARGA` `Targa`, Output image in `Targa` format.
- `TARGA_RAW` `Targa Raw`, Output image in uncompressed `Targa` format.
- `AVI_JPEG` `AVI JPEG`, Output video in `AVI JPEG` format.

- AVI_RAW AVI Raw, Output video in AVI Raw format.

Type enum in ['BMP', 'IRIS', 'PNG', 'JPEG', 'TARGA', 'TARGA_RAW', 'AVI_JPEG', 'AVI_RAW'], default 'TARGA'

filepath

Image/Movie file name

Type string, default ""

filepath_raw

Image/Movie file name (without data refreshing)

Type string, default ""

fps

Speed of the animation in frames per second

Type int in [1, 100], default 0

frame_end

End frame of an animated texture

Type int in [0, 128], default 0

frame_start

Start frame of an animated texture

Type int in [0, 128], default 0

generated_height

Generated image height

Type int in [1, 16384], default 0

generated_type

Generated image type

- BLANK Blank, Generate a blank image.
- UV_GRID UV Grid, Generated grid to test UV mappings.
- COLOR_GRID Color Grid, Generated improved UV grid to test UV mappings.

Type enum in ['BLANK', 'UV_GRID', 'COLOR_GRID'], default 'BLANK'

generated_width

Generated image width

Type int in [1, 16384], default 0

has_data

True if this image has data

Type boolean, default False, (readonly)

is_dirty

Image has changed and is not saved

Type boolean, default False, (readonly)

mapping

Mapping type to use for this image in the game engine

- UV UV Coordinates, Use UV coordinates for mapping the image.

•REFLECTION Reflection, Use reflection mapping for mapping the image.

Type enum in ['UV', 'REFLECTION'], default 'UV'

packed_file

Type PackedFile, (readonly)

pixels

Image pixels in floating point values

Type float in [-inf, inf], default 0.0

resolution

X/Y pixels per meter

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

size

Width and height in pixels, zero when image data cant be loaded

Type int array of 2 items in [-inf, inf], default (0, 0), (readonly)

source

Where the image comes from

- FILE Single Image, Single image file.
- SEQUENCE Image Sequence, Multiple image files, as a sequence.
- MOVIE Movie File, Movie file.
- GENERATED Generated, Generated image.
- VIEWER Viewer, Compositing node viewer.

Type enum in ['FILE', 'SEQUENCE', 'MOVIE', 'GENERATED', 'VIEWER'], default 'FILE'

tiles_x

Degree of repetition in the X direction

Type int in [1, 16], default 0

tiles_y

Degree of repetition in the Y direction

Type int in [1, 16], default 0

type

How to generate the image

Type enum in ['IMAGE', 'MULTILAYER', 'UV_TEST', 'RENDER_RESULT', 'COMPOSITING'], default 'IMAGE', (readonly)

use_animation

Use as animated texture in the game engine

Type boolean, default False

use_clamp_x

Disable texture repeating horizontally

Type boolean, default False

use_clamp_y

Disable texture repeating vertically

Type boolean, default False

use_fields

Use fields of the image

Type boolean, default False

use_generated_float

Generate floating point buffer

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_tiles

Use of tilemode for faces (default shift-LMB to pick the tile for selected faces)

Type boolean, default False

save_render (*filepath*, *scene=None*)

Save image to a specific path using a scenes render settings

Parameters

- **filepath** (*string*) – Save path
- **scene** (*Scene*, (optional)) – Scene to take image parameters from

save ()

Save image to its source path

pack (*as_png=False*)

Pack an image as embedded data into the .blend file

Parameters **as_png** (*boolean*, (optional)) – as_png, Pack the image as PNG (needed for generated/dirty images)

unpack (*method='USE_LOCAL'*)

Save an image packed in the .blend file to disk

Parameters **method** (*enum in ['USE_LOCAL', 'WRITE_LOCAL', 'USE_ORIGINAL', 'WRITE_ORIGINAL']*, (optional)) – method, How to unpack

reload ()

Reload the image from its source path

update ()

Update the display image from the floating point buffer

gl_load (*filter=9985*, *mag=9729*)

Load the image into OpenGL graphics memory

Parameters

- **filter** (*int in [-inf, inf]*, (optional)) – Filter, The texture minifying function
- **mag** (*int in [-inf, inf]*, (optional)) – Magnification, The texture magnification function

Returns Error, OpenGL error value

Return type int in [-inf, inf]

`gl_free()`

Free the image from OpenGL graphics memory

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BackgroundImage.image`
- `BlendData.images`
- `BlendDataImages.load`
- `BlendDataImages.new`
- `BlendDataImages.remove`
- `Brush.clone_image`
- `CompositorNodeImage.image`
- `EnvironmentMapTexture.image`
- `ImageTexture.image`
- `MeshTextureFace.image`
- `ShaderNodeTexEnvironment.image`

- `ShaderNodeTexImage.image`
- `SpaceImageEditor.image`
- `TextureNodeImage.image`
- `UILayout.template_image_layers`
- `UVProjectModifier.image`
- `VoxelDataTexture.image`

2.4.273 ImagePaint(Paint)

base classes — `bpy_struct`, `Paint`

class `bpy.types.ImagePaint` (*Paint*)

Properties of image and texture painting mode

invert_stencil

Invert the stencil layer

Type boolean, default False

normal_angle

Paint most on faces pointing towards the view according to this angle

Type int in [0, 90], default 0

screen_grab_size

Size to capture the image for re-projecting

Type int array of 2 items in [512, 16384], default (0, 0)

seam_bleed

Extend paint beyond the faces UVs to reduce seams (in pixels, slower)

Type int in [0, 32767], default 0

use_backface_culling

Ignore faces pointing away from the view (faster)

Type boolean, default False

use_clone_layer

Use another UV layer as clone source, otherwise use 3D the cursor as the source

Type boolean, default False

use_normal_falloff

Paint most on faces pointing towards the view

Type boolean, default False

use_occlude

Only paint onto the faces directly under the brush (slower)

Type boolean, default False

use_projection

Use projection painting for improved consistency in the brush strokes

Type boolean, default False

use_stencil_layer

Set the mask layer from the UV layer buttons

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Paint.brush`
- `Paint.show_low_resolution`
- `Paint.show_brush`
- `Paint.show_brush_on_surface`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ToolSettings.image_paint`

2.4.274 ImageSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.ImageSequence` (*Sequence*)

Sequence strip to load one or more images

animation_offset_end

Animation end offset (trim end)

Type `int` in `[0, inf]`, default `0`

animation_offset_start

Animation start offset (trim start)

Type `int` in `[0, inf]`, default `0`

color_balance

Type `SequenceColorBalance`, (readonly)

color_multiply

Type `float` in `[0, 20]`, default `0.0`

color_saturation

Type float in [0, 20], default 0.0

crop

Type `SequenceCrop`, (readonly)

directory

Type string, default ""

elements

Type `bpy_prop_collection` of `SequenceElement`, (readonly)

proxy

Type `SequenceProxy`, (readonly)

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

ttransform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.275 ImageTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.ImageTexture` (*Texture*)

checker_distance

Sets distance between checker tiles

Type float in [0, 0.99], default 0.0

crop_max_x

Sets maximum X value to crop the image

Type float in [-10, 10], default 0.0

crop_max_y

Sets maximum Y value to crop the image

Type float in [-10, 10], default 0.0

crop_min_x

Sets minimum X value to crop the image

Type float in [-10, 10], default 0.0

crop_min_y

Sets minimum Y value to crop the image

Type float in [-10, 10], default 0.0

extension

Sets how the image is extrapolated past its original bounds

- **EXTEND** Extend, Extend by repeating edge pixels of the image.
- **CLIP** Clip, Clip to image size and sets exterior pixels as transparent.
- **CLIP_CUBE** Clip Cube, Clip to cubic-shaped area around the image and sets exterior pixels as transparent.
- **REPEAT** Repeat, Cause the image to repeat horizontally and vertically.
- **CHECKER** Checker, Cause the image to repeat in checker board pattern.

Type enum in ['EXTEND', 'CLIP', 'CLIP_CUBE', 'REPEAT', 'CHECKER'], default 'EXTEND'

filter_eccentricity

Maximum eccentricity. Higher gives less blur at distant/oblique angles, but is also slower

Type int in [1, 256], default 0

filter_probes

Maximum number of samples. Higher gives less blur at distant/oblique angles, but is also slower

Type int in [1, 256], default 0

filter_size

Multiply the filter size used by MIP Map and Interpolation

Type float in [0.1, 50], default 0.0

filter_type

Texture filter to use for sampling image

Type enum in ['BOX', 'EWA', 'FELINE', 'AREA'], default 'BOX'

image

Type Image

image_user

Parameters defining which layer, pass and frame of the image is displayed

Type ImageUser, (readonly)

invert_alpha

Inverts all the alpha values in the image

Type boolean, default False

repeat_x

Sets a repetition multiplier in the X direction

Type int in [1, 512], default 0

repeat_y

Sets a repetition multiplier in the Y direction

Type int in [1, 512], default 0

use_alpha

Uses the alpha channel information in the image

Type boolean, default False

use_calculate_alpha

Calculates an alpha channel based on RGB values in the image

Type boolean, default False

use_checker_even

Sets even checker tiles

Type boolean, default False

use_checker_odd

Sets odd checker tiles

Type boolean, default False

use_derivative_map

Uses red and green as derivative values

Type boolean, default False

use_filter_size_min

Use Filter Size as a minimal filter value in pixels

Type boolean, default False

use_flip_axis

Flips the texture's X and Y axis

Type boolean, default False

use_interpolation

Interpolates pixels using selected filter

Type boolean, default False

use_mipmap

Uses auto-generated MIP maps for the image

Type boolean, default False

use_mipmap_gauss

Use Gauss filter to sample down MIP maps

Type boolean, default False

use_mirror_x

Mirrors the image repetition on the X direction

Type boolean, default False

use_mirror_y

Mirrors the image repetition on the Y direction

Type boolean, default False

use_normal_map

Uses image RGB values for normal mapping

Type boolean, default False

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`

- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.276 ImageUser(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ImageUser` (*bpy_struct*)

Parameters defining how an Image datablock is used by another datablock

fields_per_frame

Number of fields per rendered frame (2 fields is 1 image)

Type int in [1, 200], default 0

frame_duration

Number of images of a movie to use

Type int in [0, 300000], default 0

frame_offset

Offset the number of the frame to use in the animation

Type int in [-300000, 300000], default 0

frame_start

Global starting frame of the movie/sequence, assuming first picture has a #1

Type int in [-300000, 300000], default 0

multilayer_layer

Layer in multilayer image

Type int in [0, 32767], default 0, (readonly)

multilayer_pass

Pass in multilayer image

Type int in [0, 32767], default 0, (readonly)

use_auto_refresh

Always refresh image on frame changes

Type boolean, default False

use_cyclic

Cycle the images in the movie

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BackgroundImage.image_user`
- `EnvironmentMapTexture.image_user`
- `ImageTexture.image_user`
- `SpaceImageEditor.image_user`
- `UILayout.template_image`
- `UILayout.template_image_layers`
- `VoxelDataTexture.image_user`

2.4.277 InflowFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.InflowFluidSettings` (*FluidSettings*)

Fluid simulation settings for objects adding fluids in the simulation

inflow_velocity

Initial velocity of fluid

Type float array of 3 items in [-1000.1, 1000.1], default (0.0, 0.0, 0.0)

use

Object contributes to the fluid simulation

Type boolean, default False

use_animated_mesh

Export this mesh as an animated one. Slower, only use if really necessary (e.g. armatures or parented objects), animated pos/rot/scale IPOs do not require it

Type boolean, default False

use_local_coords

Use local coordinates for inflow. (e.g. for rotating objects)

Type boolean, default False

volume_initialization

Volume initialization type

- **VOLUME** Volume, Use only the inner volume of the mesh.
- **SHELL** Shell, Use only the outer shell of the mesh.
- **BOTH** Both, Use both the inner volume and the outer shell of the mesh.

Type enum in ['VOLUME', 'SHELL', 'BOTH'], default 'VOLUME'

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.278 `IntProperties(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.IntProperties` (*bpy_struct*)

Collection of int properties

new (*name="Int Prop"*)

Add a integer property layer to Mesh

Parameters *name* (*string, (optional)*) – Int property name

Returns The newly created layer

Return type `MeshIntPropertyLayer`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.layers_int`

2.4.279 IntProperty(Property)

base classes — `bpy_struct`, `Property`

class `bpy.types.IntProperty` (*Property*)
RNA integer number property definition

array_length

Maximum length of the array, 0 means unlimited

Type `int` in `[0, inf]`, default 0, (readonly)

default

Default value for this number

Type `int` in `[-inf, inf]`, default 0, (readonly)

default_array

Default value for this array

Type `int` array of 3 items in `[-inf, inf]`, default (0, 0, 0), (readonly)

hard_max

Maximum value used by buttons

Type `int` in `[-inf, inf]`, default 0, (readonly)

hard_min

Minimum value used by buttons

Type `int` in `[-inf, inf]`, default 0, (readonly)

soft_max

Maximum value used by buttons

Type `int` in `[-inf, inf]`, default 0, (readonly)

soft_min

Minimum value used by buttons

Type `int` in `[-inf, inf]`, default 0, (readonly)

step

Step size used by number buttons, for floats 1/100th of the step size

Type `int` in `[0, inf]`, default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`

- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.280 Itasc(IKParam)

base classes — `bpy_struct`, `IKParam`

class `bpy.types.Itasc` (*IKParam*)
Parameters for the iTaSC IK solver

damping_epsilon

Singular value under which damping is progressively applied (higher values=more stability, less reactivity
- default=0.1)

Type float in [0, 1], default 0.0

damping_max

Maximum damping coefficient when singular value is nearly 0 (higher values=more stability, less reactivity
- default=0.5)

Type float in [0, 1], default 0.0

feedback

Feedback coefficient for error correction. Average response time=1/feedback. Default=20

Type float in [0, 100], default 0.0

iterations

Maximum number of iterations for convergence in case of reiteration

Type int in [1, 1000], default 0

mode

- **ANIMATION** Animation, Stateless solver computing pose starting from current action and non-IK constraints.
- **SIMULATION** Simulation, Statefull solver running in real-time context and ignoring actions and non-IK constraints.

Type enum in ['ANIMATION', 'SIMULATION'], default 'ANIMATION'

precision

Precision of convergence in case of reiteration

Type float in [0, 0.1], default 0.0

reiteration_method

Defines if the solver is allowed to reiterate (converges until precision is met) on none, first or all frames

- **NEVER** Never, The solver does not reiterate, not even on first frame (starts from rest pose).
- **INITIAL** Initial, The solver reiterates (converges) on the first frame but not on subsequent frame.
- **ALWAYS** Always, The solver reiterates (converges) on all frames.

Type enum in ['NEVER', 'INITIAL', 'ALWAYS'], default 'NEVER'

solver

Solving method selection: Automatic damping or manual damping

- **SDLS** SDLS, Selective Damped Least Square.
- **DLS** DLS, Damped Least Square with Numerical Filtering.

Type enum in ['SDLS', 'DLS'], default 'SDLS'

step_count

Divides the frame interval into this many steps

Type int in [1, 50], default 0

step_max

Higher bound for timestep in second in case of automatic substeps

Type float in [0, 1], default 0.0

step_min

Lower bound for timestep in second in case of automatic substeps

Type float in [0, 0.1], default 0.0

use_auto_step

Automatically determine the optimal number of steps for best performance/accuracy trade off

Type boolean, default False

velocity_max

Maximum joint velocity in rad/s. Default=50

Type float in [0, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `IKParam.ik_solver`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.281 JoystickSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.JoystickSensor` (*Sensor*)

Sensor to detect joystick events

axis_direction

The direction of the axis

Type enum in ['RIGHTAXIS', 'UPAXIS', 'LEFTAXIS', 'DOWNAXIS'], default 'RIGHTAXIS'

axis_number

Specify which axis pair to use, 1 is usually the main direction input

Type int in [1, 8], default 0

axis_threshold

Specify the precision of the axis

Type int in [0, 32768], default 0

button_number

Specify which button to use

Type int in [0, 18], default 0

event_type

The type of event this joystick sensor is triggered on

Type enum in ['BUTTON', 'AXIS', 'HAT', 'AXIS_SINGLE'], default 'BUTTON'

hat_direction

Specify hat direction

Type enum in ['UP', 'DOWN', 'LEFT', 'RIGHT', 'UPRIGHT', 'DOWNLEFT', 'UPLEFT', 'DOWNRIGHT'], default 'UP'

hat_number

Specify which hat to use

Type int in [1, 2], default 0

joystick_index

Specify which joystick to use

Type int in [0, 7], default 0

single_axis_number

Specify a single axis (verticle/horizontal/other) to detect

Type int in [1, 16], default 0

use_all_events

Triggered by all events on this joysticks current type (axis/button/hat)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.282 Key(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Key` (*ID*)

Shape keys datablock containing different shapes of geometric datablocks

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

key_blocks

Shape keys

Type `bpy_prop_collection` of `ShapeKey`, (readonly)

reference_key

Type `ShapeKey`, (readonly, never `None`)

slurph

Creates a delay in amount of frames in applying keypositions, first vertex goes first

Type `int` in `[-500, 500]`, default `0`

use_relative

Makes shape keys relative

Type `boolean`, default `False`

user

Datablock using these shape keys

Type `ID`, (readonly, never `None`)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.shape_keys`
- `Curve.shape_keys`
- `Lattice.shape_keys`
- `Mesh.shape_keys`

2.4.283 KeyConfig(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyConfig` (*bpy_struct*)

Input configuration, including keymaps

is_user_defined

Indicates that a keyconfig was defined by the user

Type boolean, default False, (readonly)

keymaps

Key maps configured as part of this configuration

Type `KeyMaps` `bpy_prop_collection` of `KeyMap`, (readonly)

name

Name of the key configuration

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyConfigurations.active`
- `KeyConfigurations.addon`
- `KeyConfigurations.default`
- `KeyConfigurations.new`
- `KeyConfigurations.remove`
- `KeyConfigurations.user`
- `WindowManager.keyconfigs`

2.4.284 KeyConfigurations(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyConfigurations` (*bpy_struct*)

Collection of KeyConfigs

active

Active key configuration (preset)

Type `KeyConfig`

addon

Key configuration that can be extended by addons, and is added to the active configuration when handling events

Type `KeyConfig`, (readonly)

default

Default builtin key configuration

Type `KeyConfig`, (readonly)

user

Final key configuration that combines keymaps from the active and addon configurations, and can be edited by the user

Type `KeyConfig`, (readonly)

new (*name*)

new

Parameters `name` (*string*) – Name

Returns Key Configuration, Added key configuration

Return type `KeyConfig`

remove (*keyconfig*)
remove

Parameters **keyconfig** (`KeyConfig`) – Key Configuration, Removed key configuration

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `WindowManager.keyconfigs`

2.4.285 KeyMap(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.KeyMap` (*bpy_struct*)
Input configuration, including keymaps

is_modal

Indicates that a keymap is used for translate modal events for an operator

Type boolean, default False, (readonly)

is_user_modified

Keymap is defined by the user

Type boolean, default False

keymap_items

Items in the keymap, linking an operator to an input event

Type `KeyMapItems bpy_prop_collection` of `KeyMapItem`, (readonly)

name

Name of the key map

Type string, default "", (readonly)

region_type

Optional region type keymap is associated with

Type enum in ['WINDOW', 'HEADER', 'CHANNELS', 'TEMPORARY', 'UI', 'TOOLS', 'TOOL_PROPS', 'PREVIEW'], default 'WINDOW', (readonly)

show_expanded_children

Children expanded in the user interface

Type boolean, default False

show_expanded_items

Expanded in the user interface

Type boolean, default False

space_type

Optional space type keymap is associated with

Type enum in ['EMPTY', 'VIEW_3D', 'GRAPH_EDITOR', 'OUTLINER', 'PROPERTIES', 'FILE_BROWSER', 'IMAGE_EDITOR', 'INFO', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'DOPESHEET_EDITOR', 'NLA_EDITOR', 'TIMELINE', 'NODE_EDITOR', 'LOGIC_EDITOR', 'CONSOLE', 'USER_PREFERENCES', 'CLIP_EDITOR'], default 'EMPTY', (readonly)

active ()

active

Returns Key Map, Active key map

Return type `KeyMap`

restore_to_default ()

restore_to_default

restore_item_to_default (item)

restore_item_to_default

Parameters `item` (`KeyMapItem`, (never None)) – Item

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyConfig.keymaps`
- `KeyMap.active`
- `KeyMaps.find`
- `KeyMaps.find_modal`
- `KeyMaps.new`

2.4.286 KeyMapItem(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyMapItem` (*bpy_struct*)
Item in a Key Map

active

Activate or deactivate item

Type boolean, default False

alt

Alt key pressed

Type boolean, default False

any

Any modifier keys pressed

Type boolean, default False

ctrl

Control key pressed

Type boolean, default False

id

ID of the item

Type int in [-32768, 32767], default 0, (readonly)

idname

Identifier of operator to call on input event

Type string, default ""

is_user_defined

Is this keymap item user defined (doesn't just replace a builtin item)

Type boolean, default False, (readonly)

is_user_modified

Is this keymap item modified by the user

Type boolean, default False, (readonly)

key_modifier

Regular key pressed as a modifier

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE'

map_type

Type of event mapping

Type enum in ['KEYBOARD', 'TWEAK', 'MOUSE', 'NDOF', 'TEXTINPUT', 'TIMER'], default 'KEYBOARD'

name

Name of operator to call on input event

Type string, default "", (readonly)

oskey

Operating system key pressed

Type boolean, default False

properties

Properties to set when the operator is called

Type `OperatorProperties`, (readonly)

propvalue

The value this event translates to in a modal keymap

Type enum in ['NONE'], default 'NONE'

shift

Shift key pressed

Type boolean, default False

show_expanded

Show key map event and property details in the user interface

Type boolean, default False

type

Type of event

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE'

value

Type enum in ['ANY', 'NOTHING', 'PRESS', 'RELEASE', 'CLICK', 'DOUBLE_CLICK'],
default 'NOTHING'

compare (*item*)

compare

Parameters *item* (`KeyMapItem`) – Item

Returns Comparison result

Return type boolean

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyMap.keymap_items`
- `KeyMap.restore_item_to_default`
- `KeyMapItem.compare`
- `KeyMapItems.from_id`
- `KeyMapItems.new`
- `KeyMapItems.new_modal`
- `KeyMapItems.remove`
- `UILayout.template_keymap_item_properties`

2.4.287 KeyMapItems(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyMapItems` (*bpy_struct*)
Collection of keymap items

new (*idname*, *type*, *value*, *any=False*, *shift=False*, *ctrl=False*, *alt=False*, *oskey=False*,
key_modifier='NONE')
 new

Parameters

- **idname** (*string*) – Operator Identifier
- **type** (*enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10']*) – Type
- **value** (*enum in ['ANY', 'NOTHING', 'PRESS', 'RELEASE', 'CLICK', 'DOUBLE_CLICK']*) – Value
- **any** (*boolean, (optional)*) – Any
- **shift** (*boolean, (optional)*) – Shift
- **ctrl** (*boolean, (optional)*) – Ctrl
- **alt** (*boolean, (optional)*) – Alt
- **oskey** (*boolean, (optional)*) – OS Key
- **key_modifier** (*enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEEL-*

DOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], (optional)) – Key Modifier

Returns Item, Added key map item

Return type `KeyMapItem`

new_modal (*propvalue*, *type*, *value*, *any=False*, *shift=False*, *ctrl=False*, *alt=False*, *oskey=False*, *key_modifier='NONE'*)
new_modal

Parameters

- **propvalue** (*string*) – Property Value
- **type** (*enum in* [`'NONE'`, `'LEFTMOUSE'`, `'MIDDLEMOUSE'`, `'RIGHTMOUSE'`, `'BUTTON4MOUSE'`, `'BUTTON5MOUSE'`, `'ACTIONMOUSE'`, `'SELECTMOUSE'`, `'MOUSEMOVE'`, `'INBETWEEN_MOUSEMOVE'`, `'TRACKPADPAN'`, `'TRACKPADZOOM'`, `'MOUSEROTATE'`, `'WHEELUPMOUSE'`, `'WHEELDOWNMOUSE'`, `'WHEELINMOUSE'`, `'WHEELOUTMOUSE'`, `'EVT_TWEAK_L'`, `'EVT_TWEAK_M'`, `'EVT_TWEAK_R'`, `'EVT_TWEAK_A'`, `'EVT_TWEAK_S'`, `'A'`, `'B'`, `'C'`, `'D'`, `'E'`, `'F'`, `'G'`, `'H'`, `'I'`, `'J'`, `'K'`, `'L'`, `'M'`, `'N'`, `'O'`, `'P'`, `'Q'`, `'R'`, `'S'`, `'T'`, `'U'`, `'V'`, `'W'`, `'X'`, `'Y'`, `'Z'`, `'ZERO'`, `'ONE'`, `'TWO'`, `'THREE'`, `'FOUR'`, `'FIVE'`, `'SIX'`, `'SEVEN'`, `'EIGHT'`, `'NINE'`, `'LEFT_CTRL'`, `'LEFT_ALT'`, `'LEFT_SHIFT'`, `'RIGHT_ALT'`, `'RIGHT_CTRL'`, `'RIGHT_SHIFT'`, `'OSKEY'`, `'GRLESS'`, `'ESC'`, `'TAB'`, `'RET'`, `'SPACE'`, `'LINE_FEED'`, `'BACK_SPACE'`, `'DEL'`, `'SEMI_COLON'`, `'PERIOD'`, `'COMMA'`, `'QUOTE'`, `'ACCENT_GRAVE'`, `'MINUS'`, `'SLASH'`, `'BACK_SLASH'`, `'EQUAL'`, `'LEFT_BRACKET'`, `'RIGHT_BRACKET'`, `'LEFT_ARROW'`, `'DOWN_ARROW'`, `'RIGHT_ARROW'`, `'UP_ARROW'`, `'NUMPAD_2'`, `'NUMPAD_4'`, `'NUMPAD_6'`,

'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7',
 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX',
 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS',
 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12',
 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME',
 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'ME-
 DIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0',
 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT',
 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT',
 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK',
 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW',
 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW',
 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW',
 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE',
 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT',
 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1',
 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4',
 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7',
 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'}) – Type

- **value** (enum in ['ANY', 'NOTHING', 'PRESS', 'RELEASE', 'CLICK', 'DOUBLE_CLICK']) – Value
- **any** (boolean, (optional)) – Any
- **shift** (boolean, (optional)) – Shift
- **ctrl** (boolean, (optional)) – Ctrl
- **alt** (boolean, (optional)) – Alt
- **oskey** (boolean, (optional)) – OS Key
- **key_modifier** (enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK',

`'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW',`
`'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW',`
`'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW',`
`'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE',`
`'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT',`
`'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1',`
`'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4',`
`'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7',`
`'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], (optional) –`
 Key Modifier

Returns Item, Added key map item

Return type `KeyMapItem`

remove (*item*)
remove

Parameters *item* (`KeyMapItem`) – Item

from_id (*id*)
from_id

Parameters *id* (*int in [-inf, inf]*) – id, ID of the item

Returns Item

Return type `KeyMapItem`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyMap.keymap_items`

2.4.288 KeyMaps(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyMaps` (*bpy_struct*)

Collection of keymaps

new (*name*, *space_type*='EMPTY', *region_type*='WINDOW', *modal*=False)
new

Parameters

- **name** (*string*) – Name
- **space_type** (*enum* in [`'EMPTY'`, `'VIEW_3D'`, `'GRAPH_EDITOR'`, `'OUTLINER'`, `'PROPERTIES'`, `'FILE_BROWSER'`, `'IMAGE_EDITOR'`, `'INFO'`, `'SEQUENCE_EDITOR'`, `'TEXT_EDITOR'`, `'DOPESHEET_EDITOR'`, `'NLA_EDITOR'`, `'TIMELINE'`, `'NODE_EDITOR'`, `'LOGIC_EDITOR'`, `'CONSOLE'`, `'USER_PREFERENCES'`, `'CLIP_EDITOR'`], (*optional*)) – Space Type
- **region_type** (*enum* in [`'WINDOW'`, `'HEADER'`, `'CHANNELS'`, `'TEMPORARY'`, `'UI'`, `'TOOLS'`, `'TOOL_PROPS'`, `'PREVIEW'`], (*optional*)) – Region Type
- **modal** (*boolean*, (*optional*)) – Modal

Returns Key Map, Added key map

Return type `KeyMap`

find (*name*, *space_type*='EMPTY', *region_type*='WINDOW')
find

Parameters

- **name** (*string*) – Name
- **space_type** (*enum* in [`'EMPTY'`, `'VIEW_3D'`, `'GRAPH_EDITOR'`, `'OUTLINER'`, `'PROPERTIES'`, `'FILE_BROWSER'`, `'IMAGE_EDITOR'`, `'INFO'`, `'SEQUENCE_EDITOR'`, `'TEXT_EDITOR'`, `'DOPESHEET_EDITOR'`, `'NLA_EDITOR'`, `'TIMELINE'`, `'NODE_EDITOR'`, `'LOGIC_EDITOR'`, `'CONSOLE'`, `'USER_PREFERENCES'`, `'CLIP_EDITOR'`], (*optional*)) – Space Type
- **region_type** (*enum* in [`'WINDOW'`, `'HEADER'`, `'CHANNELS'`, `'TEMPORARY'`, `'UI'`, `'TOOLS'`, `'TOOL_PROPS'`, `'PREVIEW'`], (*optional*)) – Region Type

Returns Key Map, Corresponding key map

Return type `KeyMap`

find_modal (*name*)
find_modal

Parameters **name** (*string*) – Operator Name

Returns Key Map, Corresponding key map

Return type `KeyMap`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyConfig.keymaps`

2.4.289 KeyboardSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.KeyboardSensor` (*Sensor*)
 Sensor to detect keyboard events

key

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0',

```

'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT',
'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT',
'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK',
'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW',
'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW',
'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW',
'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE',
'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT',
'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1',
'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4',
'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7',
'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE'

```

log

Property that indicates whether to log keystrokes as a string

Type string, default ""

modifier_key_1

Modifier key code

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE'

modifier_key_2

Modifier key code

Type enum in ['NONE', 'LEFTMOUSE', 'MIDDLEMOUSE', 'RIGHTMOUSE', 'BUTTON4MOUSE', 'BUTTON5MOUSE', 'ACTIONMOUSE', 'SELECTMOUSE', 'MOUSEMOVE', 'INBETWEEN_MOUSEMOVE', 'TRACKPADPAN', 'TRACKPADZOOM', 'MOUSEROTATE', 'WHEELUPMOUSE', 'WHEELDOWNMOUSE', 'WHEELINMOUSE', 'WHEELOUTMOUSE', 'EVT_TWEAK_L', 'EVT_TWEAK_M', 'EVT_TWEAK_R', 'EVT_TWEAK_A', 'EVT_TWEAK_S', 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'ZERO', 'ONE', 'TWO', 'THREE', 'FOUR', 'FIVE', 'SIX', 'SEVEN', 'EIGHT', 'NINE', 'LEFT_CTRL', 'LEFT_ALT', 'LEFT_SHIFT', 'RIGHT_ALT', 'RIGHT_CTRL', 'RIGHT_SHIFT', 'OSKEY', 'GRLESS', 'ESC', 'TAB', 'RET', 'SPACE', 'LINE_FEED', 'BACK_SPACE', 'DEL', 'SEMI_COLON', 'PERIOD', 'COMMA', 'QUOTE', 'ACCENT_GRAVE', 'MINUS', 'SLASH', 'BACK_SLASH', 'EQUAL', 'LEFT_BRACKET', 'RIGHT_BRACKET', 'LEFT_ARROW', 'DOWN_ARROW', 'RIGHT_ARROW', 'UP_ARROW', 'NUMPAD_2', 'NUMPAD_4', 'NUMPAD_6', 'NUMPAD_8', 'NUMPAD_1', 'NUMPAD_3', 'NUMPAD_5', 'NUMPAD_7', 'NUMPAD_9', 'NUMPAD_PERIOD', 'NUMPAD_SLASH', 'NUMPAD_ASTERIX', 'NUMPAD_0', 'NUMPAD_MINUS', 'NUMPAD_ENTER', 'NUMPAD_PLUS', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7', 'F8', 'F9', 'F10', 'F11', 'F12', 'F13', 'F14', 'F15', 'F16', 'F17', 'F18', 'F19', 'PAUSE', 'INSERT', 'HOME', 'PAGE_UP', 'PAGE_DOWN', 'END', 'MEDIA_PLAY', 'MEDIA_STOP', 'MEDIA_FIRST', 'MEDIA_LAST', 'WINDOW_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2', 'NDOF_BUTTON_MENU', 'NDOF_BUTTON_FIT', 'NDOF_BUTTON_TOP', 'NDOF_BUTTON_BOTTOM', 'NDOF_BUTTON_LEFT', 'NDOF_BUTTON_RIGHT', 'NDOF_BUTTON_FRONT', 'NDOF_BUTTON_BACK', 'NDOF_BUTTON_ISO1', 'NDOF_BUTTON_ISO2', 'NDOF_BUTTON_ROLL_CW', 'NDOF_BUTTON_ROLL_CCW', 'NDOF_BUTTON_SPIN_CW', 'NDOF_BUTTON_SPIN_CCW', 'NDOF_BUTTON_TILT_CW', 'NDOF_BUTTON_TILT_CCW', 'NDOF_BUTTON_ROTATE', 'NDOF_BUTTON_PANZOOM', 'NDOF_BUTTON_DOMINANT', 'NDOF_BUTTON_PLUS', 'NDOF_BUTTON_MINUS', 'NDOF_BUTTON_1', 'NDOF_BUTTON_2', 'NDOF_BUTTON_3', 'NDOF_BUTTON_4', 'NDOF_BUTTON_5', 'NDOF_BUTTON_6', 'NDOF_BUTTON_7', 'NDOF_BUTTON_8', 'NDOF_BUTTON_9', 'NDOF_BUTTON_10'], default 'NONE'

target

Property that receive the keystrokes in case a string is logged

Type string, default ""

use_all_keys

Trigger this sensor on any keystroke

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`

- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.290 Keyframe(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Keyframe` (*`bpy_struct`*)

Bezier curve point with two handles defining a Keyframe on an F-Curve

co

Coordinates of the control point

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`

handle_left

Coordinates of the left handle (before the control point)

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`

handle_left_type

Handle types

- `FREE` Free.
- `VECTOR` Vector.
- `ALIGNED` Aligned.
- `AUTO` Automatic.
- `AUTO_CLAMPED` Auto Clamped, Auto handles clamped to not overshoot.

Type enum in `['FREE', 'VECTOR', 'ALIGNED', 'AUTO', 'AUTO_CLAMPED']`, default `'FREE'`

handle_right

Coordinates of the right handle (after the control point)

Type float array of 2 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0)

handle_right_type

Handle types

- FREE Free.
- VECTOR Vector.
- ALIGNED Aligned.
- AUTO Automatic.
- AUTO_CLAMPED Auto Clamped, Auto handles clamped to not overshoot.

Type enum in ['FREE', 'VECTOR', 'ALIGNED', 'AUTO', 'AUTO_CLAMPED'], default 'FREE'

interpolation

Interpolation method to use for segment of the F-Curve from this Keyframe until the next Keyframe

Type enum in ['CONSTANT', 'LINEAR', 'BEZIER'], default 'CONSTANT'

select_control_point

Control point selection status

Type boolean, default False

select_left_handle

Left handle selection status

Type boolean, default False

select_right_handle

Right handle selection status

Type boolean, default False

type

Type of keyframe (for visual purposes only)

Type enum in ['KEYFRAME', 'BREAKDOWN', 'EXTREME', 'JITTER'], default 'KEYFRAME'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FCurve.keyframe_points`
- `FCurveKeyframePoints.insert`
- `FCurveKeyframePoints.remove`

2.4.291 KeyingSet(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyingSet` (*bpy_struct*)
Settings that should be keyframed together

bl_options

Keying set options

- `INSERTKEY_NEEDED` Insert Keyframes - Only Needed, Only insert keyframes where they're needed in the relevant F-Curves.
- `INSERTKEY_VISUAL` Insert Keyframes - Visual, Insert keyframes based on 'visual transforms'.
- `INSERTKEY_XYZ_TO_RGB` F-Curve Colors - XYZ to RGB, Color for newly added transformation F-Curves (Location, Rotation, Scale) and also Color is based on the transform axis.

Type enum set in {'INSERTKEY_NEEDED', 'INSERTKEY_VISUAL', 'INSERTKEY_XYZ_TO_RGB'}, default {'INSERTKEY_NEEDED'}

is_path_absolute

Keying Set defines specific paths/settings to be keyframed (i.e. is not reliant on context info)

Type boolean, default False, (readonly)

name

Type string, default ""

paths

Keying Set Paths to define settings that get keyframed together

Type `KeyingSetPaths` `bpy_prop_collection` of `KeyingSetPath`, (readonly)

type_info

Callback function defines for built-in Keying Sets

Type `KeyingSetInfo`, (readonly)

refresh()

Refresh Keying Set to ensure that it is valid for the current context. Call before each use of one

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyingSetInfo.generate`
- `KeyingSetInfo.iterator`
- `KeyingSets.active`
- `KeyingSets.new`
- `KeyingSetsAll.active`
- `Scene.keying_sets`
- `Scene.keying_sets_all`

2.4.292 KeyingSetInfo(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyingSetInfo` (*bpy_struct*)
 Callback function defines for builtin Keying Sets

bl_idname

Type string, default ""

bl_label

Type string, default ""

bl_options

Keying set options

- `INSERTKEY_NEEDED` Insert Keyframes - Only Needed, Only insert keyframes where they're needed in the relevant F-Curves.
- `INSERTKEY_VISUAL` Insert Keyframes - Visual, Insert keyframes based on 'visual transforms'.

- INSERTKEY_XYZ_TO_RGB F-Curve Colors - XYZ to RGB, Color for newly added transformation F-Curves (Location, Rotation, Scale) and also Color is based on the transform axis.

Type enum set in {'INSERTKEY_NEEDED', 'INSERTKEY_VISUAL', 'INSERTKEY_XYZ_TO_RGB'}, default {'INSERTKEY_NEEDED'}

poll (*context*)

Test if Keying Set can be used or not

Return type boolean

iterator (*context, ks*)

Call generate() on the structs which have properties to be keyframed

generate (*context, ks, data*)

Add Paths to the Keying Set to keyframe the properties of the given data

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyingSet.type_info`

2.4.293 KeyingSetPath(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyingSetPath` (*bpy_struct*)

Path to a setting for use in a Keying Set

array_index

Index to the specific setting if applicable

Type int in [-inf, inf], default 0

bl_options

Keying set options

- **INSERTKEY_NEEDED** Insert Keyframes - Only Needed, Only insert keyframes where they're needed in the relevant F-Curves.
- **INSERTKEY_VISUAL** Insert Keyframes - Visual, Insert keyframes based on 'visual transforms'.
- **INSERTKEY_XYZ_TO_RGB** F-Curve Colors - XYZ to RGB, Color for newly added transformation F-Curves (Location, Rotation, Scale) and also Color is based on the transform axis.

Type enum set in {'INSERTKEY_NEEDED', 'INSERTKEY_VISUAL', 'INSERTKEY_XYZ_TO_RGB'}, default {'INSERTKEY_NEEDED'}

data_path

Path to property setting

Type string, default ""

group

Name of Action Group to assign setting(s) for this path to

Type string, default ""

group_method

Method used to define which Group-name to use

Type enum in ['NAMED', 'NONE', 'KEYINGSET'], default 'NAMED'

id

ID-Block that keyframes for Keying Set should be added to (for Absolute Keying Sets only)

Type ID

id_type

Type of ID-block that can be used

Type enum in ['ACTION', 'ARMATURE', 'BRUSH', 'CAMERA', 'CURVE', 'FONT', 'GREASEPENCIL', 'GROUP', 'IMAGE', 'KEY', 'LAMP', 'LIBRARY', 'LATTICE', 'MATERIAL', 'META', 'MESH', 'NODETREE', 'OBJECT', 'PARTICLE', 'SCENE', 'SCREEN', 'SPEAKER', 'SOUND', 'TEXT', 'TEXTURE', 'WORLD', 'WINDOWMANAGER'], default 'OBJECT'

use_entire_array

When an 'array/vector' type is chosen (Location, Rotation, Color, etc.), entire array is to be used

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyingSet.paths`
- `KeyingSetPaths.active`
- `KeyingSetPaths.add`
- `KeyingSetPaths.remove`

2.4.294 KeyingSetPaths(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyingSetPaths` (*bpy_struct*)

Collection of keying set paths

active

Active Keying Set used to insert/delete keyframes

Type `KeyingSetPath`

active_index

Current Keying Set index

Type `int` in `[-inf, inf]`, default 0

add (*target_id*, *data_path*, *index=-1*, *group_method='KEYINGSET'*, *group_name=""*)

Add a new path for the Keying Set

Parameters

- **target_id** (*ID*) – Target ID, ID-Datablock for the destination
- **data_path** (*string*) – Data-Path, RNA-Path to destination property
- **index** (*int* in `[-1, inf]`, (*optional*)) – Index, The index of the destination property (i.e. axis of Location/Rotation/etc.), or -1 for the entire array
- **group_method** (*enum* in `['NAMED', 'NONE', 'KEYINGSET']`, (*optional*)) – Grouping Method, Method used to define which Group-name to use

- **group_name** (*string, (optional)*) – Group Name, Name of Action Group to assign destination to (only if grouping mode is to use this name)

Returns New Path, Path created and added to the Keying Set

Return type `KeyingSetPath`

remove (*path*)

Remove the given path from the Keying Set

Parameters **path** (`KeyingSetPath`, (never None)) – Path

clear ()

Remove all the paths from the Keying Set

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyingSet.paths`

2.4.295 KeyingSets(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.KeyingSets` (*bpy_struct*)

Scene keying sets

active

Active Keying Set used to insert/delete keyframes

Type `KeyingSet`

active_index

Current Keying Set index (negative for ‘builtin’ and positive for ‘absolute’)

Type int in [-inf, inf], default 0

new (*name*="KeyingSet")

Add a new Keying Set to Scene

Parameters *name* (*string*, (*optional*)) – Name, Name of Keying Set

Returns Newly created Keying Set

Return type KeyingSet

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.keying_sets`

2.4.296 KeyingSetsAll(bpy_struct)

base class — `bpy_struct`

class `bpy.types.KeyingSetsAll` (*bpy_struct*)

All available keying sets

active

Active Keying Set used to insert/delete keyframes

Type KeyingSet

active_index

Current Keying Set index (negative for ‘builtin’ and positive for ‘absolute’)

Type int in [-inf, inf], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.keying_sets_all`

2.4.297 KinematicConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.KinematicConstraint` (*Constraint*)

Inverse Kinematics

chain_count

How many bones are included in the IK effect - 0 uses all bones

Type int in [0, 255], default 0

distance

Radius of limiting sphere

Type float in [0, 100], default 0.0

ik_type

Type enum in ['COPY_POSE', 'DISTANCE'], default 'COPY_POSE'

iterations

Maximum number of solving iterations

Type int in [1, 10000], default 0

limit_mode

Distances in relation to sphere of influence to allow

- LIMITDIST_INSIDE Inside, The object is constrained inside a virtual sphere around the target object, with a radius defined by the limit distance.
- LIMITDIST_OUTSIDE Outside, The object is constrained outside a virtual sphere around the target object, with a radius defined by the limit distance.
- LIMITDIST_ONSURFACE On Surface, The object is constrained on the surface of a virtual sphere around the target object, with a radius defined by the limit distance.

Type enum in ['LIMITDIST_INSIDE', 'LIMITDIST_OUTSIDE', 'LIMITDIST_ONSURFACE'], default 'LIMITDIST_INSIDE'

lock_location_x

Constraint position along X axis

Type boolean, default False

lock_location_y

Constraint position along Y axis

Type boolean, default False

lock_location_z

Constraint position along Z axis

Type boolean, default False

lock_rotation_x

Constraint rotation along X axis

Type boolean, default False

lock_rotation_y

Constraint rotation along Y axis

Type boolean, default False

lock_rotation_z

Constraint rotation along Z axis

Type boolean, default False

orient_weight

For Tree-IK: Weight of orientation control for this target

Type float in [0.01, 1], default 0.0

pole_angle

Pole rotation offset

Type float in [-3.14159, 3.14159], default 0.0

pole_subtarget

Type string, default ""

pole_target

Object for pole rotation

Type [Object](#)

reference_axis

Constraint axis Lock options relative to Bone or Target reference

Type enum in ['BONE', 'TARGET'], default 'BONE'

subtarget

Type string, default ""

target

Target Object

Type Object

use_location

Chain follows position of target

Type boolean, default False

use_rotation

Chain follows rotation of target

Type boolean, default False

use_stretch

Enable IK Stretching

Type boolean, default False

use_tail

Include bone's tail as last element in chain

Type boolean, default False

use_target

Disable for targetless IK

Type boolean, default False

weight

For Tree-IK: Weight of position control for this target

Type float in [0.01, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.298 Lamp(ID)

base classes — `bpy_struct`, `ID`

subclasses — `SpotLamp`, `AreaLamp`, `HemiLamp`, `PointLamp`, `SunLamp`

class `bpy.types.Lamp` (*ID*)

Lamp datablock for lighting a scene

active_texture

Active texture slot being displayed

Type `Texture`

active_texture_index

Index of active texture slot

Type `int` in `[0, 17]`, default `0`

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

color

Light color

Type `float` array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

distance

Falloff distance - the light is at half the original intensity at this point

Type `float` in `[0, inf]`, default `0.0`

energy

Amount of light that the lamp emits

Type `float` in `[-inf, inf]`, default `0.0`

node_tree

Node tree for node based lamps

Type `NodeTree`, (readonly)

texture_slots

Texture slots defining the mapping and influence of textures

Type `LampTextureSlots` `bpy_prop_collection` of `LampTextureSlot`, (readonly)

type

Type of Lamp

- `POINT` Point, Omnidirectional point light source.
- `SUN` Sun, Constant direction parallel ray light source.
- `SPOT` Spot, Directional cone light source.
- `HEMI` Hemi, 180 degree constant light source.
- `AREA` Area, Directional area light source.

Type enum in [`'POINT'`, `'SUN'`, `'SPOT'`, `'HEMI'`, `'AREA'`], default `'POINT'`

use_diffuse

Lamp does diffuse shading

Type boolean, default `False`

use_negative

Lamp casts negative light

Type boolean, default `False`

use_nodes

Use shader nodes to render the lamp

Type boolean, default `False`

use_own_layer

Illuminates objects only on the same layer the lamp is on

Type boolean, default `False`

use_specular

Lamp creates specular highlights

Type boolean, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.lamps`
- `BlendDataLamps.new`
- `BlendDataLamps.remove`

2.4.299 LampSkySettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.LampSkySettings` (*`bpy_struct`*)

Sky related settings for a sun lamp

atmosphere_distance_factor

Multiplier to convert blender units to physical distance

Type float in [0, 500], default 0.0

atmosphere_extinction

Extinction scattering contribution factor

Type float in [0, 1], default 0.0

atmosphere_inscattering

Scatter contribution factor

Type float in [0, 1], default 0.0

atmosphere_turbidity

Sky turbidity

Type float in [1, 30], default 0.0

backscattered_light

Backscattered light

Type float in [-1, 1], default 0.0**horizon_brightness**

Horizon brightness

Type float in [0, 20], default 0.0**sky_blend**

Blend factor with sky

Type float in [0, 2], default 0.0**sky_blend_type**

Blend mode for combining sun sky with world sky

Type enum in ['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'**sky_color_space**

Color space to use for internal XYZ->RGB color conversion

Type enum in ['SMPTE', 'REC709', 'CIE'], default 'SMPTE'**sky_exposure**

Strength of sky shading exponential exposure correction

Type float in [0, 20], default 0.0**spread**

Horizon Spread

Type float in [0, 10], default 0.0**sun_brightness**

Sun brightness

Type float in [0, 10], default 0.0**sun_intensity**

Sun intensity

Type float in [0, 10], default 0.0**sun_size**

Sun size

Type float in [0, 10], default 0.0**use_atmosphere**

Apply sun effect on atmosphere

Type boolean, default False**use_sky**

Apply sun effect on sky

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SunLamp.sky`

2.4.300 LampTextureSlot(TextureSlot)

base classes — `bpy_struct`, `TextureSlot`

class `bpy.types.LampTextureSlot` (*TextureSlot*)

Texture slot for textures in a Lamp datablock

color_factor

Amount texture affects color values

Type float in [-inf, inf], default 0.0

object

Object to use for mapping with Object texture coordinates

Type `Object`

shadow_factor

Amount texture affects shadow

Type float in [-inf, inf], default 0.0

texture_coords

- **GLOBAL** Global, Uses global coordinates for the texture coordinates.
- **VIEW** View, Uses view coordinates for the texture coordinates.
- **OBJECT** Object, Uses linked object's coordinates for texture coordinates.

Type enum in ['GLOBAL', 'VIEW', 'OBJECT'], default 'GLOBAL'

use_map_color

Lets the texture affect the basic color of the lamp

Type boolean, default False

use_map_shadow

Lets the texture affect the shadow color of the lamp

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `TextureSlot.name`
- `TextureSlot.blend_type`
- `TextureSlot.color`
- `TextureSlot.default_value`
- `TextureSlot.invert`
- `TextureSlot.offset`
- `TextureSlot.output_node`
- `TextureSlot.use_rgb_to_intensity`
- `TextureSlot.scale`
- `TextureSlot.use_stencil`
- `TextureSlot.texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Lamp.texture_slots`
- `LampTextureSlots.add`
- `LampTextureSlots.create`

2.4.301 LampTextureSlots(bpy_struct)

base class — `bpy_struct`

class `bpy.types.LampTextureSlots` (*bpy_struct*)

Collection of texture slots

classmethod `add()`

`add`

Returns The newly initialized `mtx`

Return type `LampTextureSlot`

classmethod `create(index)`

`create`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to initialize

Returns The newly initialized `mtx`

Return type `LampTextureSlot`

classmethod `clear(index)`

`clear`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to clear

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Lamp.texture_slots`

2.4.302 Lattice(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Lattice` (*ID*)

Lattice datablock defining a grid for deforming other objects

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

interpolation_type_u

Type enum in ['KEY_LINEAR', 'KEY_CARDINAL', 'KEY_BSPLINE'], default 'KEY_LINEAR'

interpolation_type_v

Type enum in ['KEY_LINEAR', 'KEY_CARDINAL', 'KEY_BSPLINE'], default 'KEY_LINEAR'

interpolation_type_w

Type enum in ['KEY_LINEAR', 'KEY_CARDINAL', 'KEY_BSPLINE'], default 'KEY_LINEAR'

points

Points of the lattice

Type `bpy_prop_collection` of `LatticePoint`, (readonly)

points_u

Points in U direction (can't be changed when there are shape keys)

Type int in [1, 64], default 0

points_v

Points in V direction (can't be changed when there are shape keys)

Type int in [1, 64], default 0

points_w

Points in W direction (can't be changed when there are shape keys)

Type int in [1, 64], default 0

shape_keys

Type `Key`, (readonly)

use_outside

Only draw, and take into account, the outer vertices

Type boolean, default False

vertex_group

Vertex group to apply the influence of the lattice

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.lattices`
- `BlendDataLattices.new`
- `BlendDataLattices.remove`

2.4.303 LatticeModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.LatticeModifier` (*Modifier*)
Lattice deformation modifier

object

Lattice object to deform with

Type `Object`

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type `string`, default `""`

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.304 LatticePoint(bpy_struct)

base class — `bpy_struct`

class `bpy.types.LatticePoint` (*bpy_struct*)

Point in the lattice grid

co

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`, (readonly)

co_deform

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

groups

Weights for the vertex groups this point is member of

Type `bpy_prop_collection` of `VertexGroupElement`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Lattice.points`

2.4.305 Library(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Library` (*ID*)

External `.blend` file from which data is linked

filepath

Path to the library `.blend` file

Type string, default ""

parent

Type `Library`, (readonly)

users_id

ID data blocks which use this library (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.libraries`
- `ID.library`
- `Library.parent`

2.4.306 LimitDistanceConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.LimitDistanceConstraint` (*Constraint*)

Limits the distance from target object

distance

Radius of limiting sphere

Type float in [0, 100], default 0.0

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

limit_mode

Distances in relation to sphere of influence to allow

- `LIMITDIST_INSIDE` Inside, The object is constrained inside a virtual sphere around the target object, with a radius defined by the limit distance.
- `LIMITDIST_OUTSIDE` Outside, The object is constrained outside a virtual sphere around the target object, with a radius defined by the limit distance.

- LIMITDIST_ONSURFACE On Surface, The object is constrained on the surface of a virtual sphere around the target object, with a radius defined by the limit distance.

Type enum in ['LIMITDIST_INSIDE', 'LIMITDIST_OUTSIDE', 'LIMITDIST_ONSURFACE'], default 'LIMITDIST_INSIDE'

subtarget

Type string, default ""

target

Target Object

Type Object

use_transform_limit

Transforms are affected by this constraint as well

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Constraint.name
- Constraint.active
- Constraint.mute
- Constraint.show_expanded
- Constraint.influence
- Constraint.error_location
- Constraint.owner_space
- Constraint.is_proxy_local
- Constraint.error_rotation
- Constraint.target_space
- Constraint.type
- Constraint.is_valid

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.307 LimitLocationConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.LimitLocationConstraint` (*Constraint*)

Limits the location of the constrained object

max_x

Highest X value to allow

Type float in [-1000, 1000], default 0.0

max_y

Highest Y value to allow

Type float in [-1000, 1000], default 0.0

max_z

Highest Z value to allow

Type float in [-1000, 1000], default 0.0

min_x

Lowest X value to allow

Type float in [-1000, 1000], default 0.0

min_y

Lowest Y value to allow

Type float in [-1000, 1000], default 0.0

min_z

Lowest Z value to allow

Type float in [-1000, 1000], default 0.0

use_max_x

Use the maximum X value

Type boolean, default False

use_max_y

Use the maximum Y value

Type boolean, default False

use_max_z

Use the maximum Z value

Type boolean, default False

use_min_x

Use the minimum X value

Type boolean, default False

use_min_y

Use the minimum Y value

Type boolean, default False

use_min_z

Use the minimum Z value

Type boolean, default False

use_transform_limit

Transforms are affected by this constraint as well

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.308 LimitRotationConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.LimitRotationConstraint` (*Constraint*)

Limits the rotation of the constrained object

max_x

Highest X value to allow

Type float in [-1000, 1000], default 0.0

max_y

Highest Y value to allow

Type float in [-1000, 1000], default 0.0

max_z

Highest Z value to allow

Type float in [-1000, 1000], default 0.0

min_x

Lowest X value to allow

Type float in [-1000, 1000], default 0.0

min_y

Lowest Y value to allow

Type float in [-1000, 1000], default 0.0

min_z

Lowest Z value to allow

Type float in [-1000, 1000], default 0.0

use_limit_x

Use the minimum X value

Type boolean, default False

use_limit_y

Use the minimum Y value

Type boolean, default False

use_limit_z

Use the minimum Z value

Type boolean, default False

use_transform_limit

Transforms are affected by this constraint as well

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.309 LimitScaleConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.LimitScaleConstraint` (*Constraint*)

Limits the scaling of the constrained object

max_x

Highest X value to allow

Type float in [-1000, 1000], default 0.0

max_y

Highest Y value to allow

Type float in [-1000, 1000], default 0.0

max_z

Highest Z value to allow

Type float in [-1000, 1000], default 0.0

min_x

Lowest X value to allow

Type float in [-1000, 1000], default 0.0

min_y

Lowest Y value to allow

Type float in [-1000, 1000], default 0.0

min_z

Lowest Z value to allow

Type float in [-1000, 1000], default 0.0

use_max_x

Use the maximum X value

Type boolean, default False

use_max_y

Use the maximum Y value

Type boolean, default False**use_max_z**

Use the maximum Z value

Type boolean, default False**use_min_x**

Use the minimum X value

Type boolean, default False**use_min_y**

Use the minimum Y value

Type boolean, default False**use_min_z**

Use the minimum Z value

Type boolean, default False**use_transform_limit**

Transforms are affected by this constraint as well

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.310 LockedTrackConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.LockedTrackConstraint` (*Constraint*)

Points toward the target along the track axis, while locking the other axis

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

lock_axis

Axis that points upward

Type enum in ['LOCK_X', 'LOCK_Y', 'LOCK_Z'], default 'LOCK_X'

subtarget

Type string, default ""

target

Target Object

Type `Object`

track_axis

Axis that points to the target object

Type enum in ['TRACK_X', 'TRACK_Y', 'TRACK_Z', 'TRACK_NEGATIVE_X', 'TRACK_NEGATIVE_Y', 'TRACK_NEGATIVE_Z'], default 'TRACK_X'

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.311 Macro(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Macro` (*bpy_struct*)

Storage of a macro operator being executed, or registered after execution

bl_description

Type string, default ""

bl_idname

Type string, default ""

bl_label

Type string, default ""

bl_options

Options for this operator type

- **REGISTER** Register, Display in the info window and support the redo toolbar panel.
- **UNDO** Undo, Push an undo event (needed for operator redo).
- **BLOCKING** Blocking, Block anything else from using the cursor.
- **MACRO** Macro, Use to check if an operator is a macro.
- **GRAB_POINTER** Grab Pointer, Use so the operator grabs the mouse focus, enables wrapping when continuous grab is enabled.
- **PRESET** Preset, Display a preset button with the operators settings.
- **INTERNAL** Internal, Removes the operator from search results.

Type enum set in { 'REGISTER', 'UNDO', 'BLOCKING', 'MACRO', 'GRAB_POINTER', 'PRESET', 'INTERNAL' }, default { 'REGISTER' }

name

Type string, default "", (readonly)

properties

Type `OperatorProperties`, (readonly, never None)

report (*type, message*)

report

Parameters

- **type** (*enum set in {'DEBUG', 'INFO', 'OPERATOR', 'WARNING', 'ERROR', 'ERROR_INVALID_INPUT', 'ERROR_INVALID_CONTEXT', 'ERROR_OUT_OF_MEMORY'}*) – Type
- **message** (*string*) – Report Message

classmethod poll (*context*)

Test if the operator can be called or not

Return type boolean

draw (*context*)

Draw function for the operator

define (*opname*)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.312 MagicTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

```

class bpy.types.MagicTexture(Texture)
    Procedural noise texture

    noise_depth
        Sets the depth of the cloud calculation

        Type int in [0, 30], default 0

    turbulence
        Sets the turbulence of the bandnoise and ringnoise types

        Type float in [0.0001, inf], default 0.0

    users_material
        Materials that use this texture (readonly)

    users_object_modifier
        Object modifiers that use this texture (readonly)

```

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.313 MaintainVolumeConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.MaintainVolumeConstraint` (*Constraint*)

Maintains a constant volume along a single scaling axis

free_axis

The free scaling axis of the object

Type enum in ['SAMEVOL_X', 'SAMEVOL_Y', 'SAMEVOL_Z'], default 'SAMEVOL_X'

volume

Volume of the bone at rest

Type float in [0.001, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.314 MarbleTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.MarbleTexture` (*Texture*)
Procedural noise texture

marble_type

- **SOFT** Soft, Uses soft marble.
- **SHARP** Sharp, Uses more clearly defined marble.
- **SHARPER** Sharper, Uses very clearly defined marble.

Type enum in ['SOFT', 'SHARP', 'SHARPER'], default 'SOFT'

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_basis

Sets the noise basis used for turbulence

- **BLENDER_ORIGINAL** Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- **ORIGINAL_PERLIN** Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- **IMPROVED_PERLIN** Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- **VORONOI_F1** Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- **VORONOI_F2** Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- **VORONOI_F3** Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- **VORONOI_F4** Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- **VORONOI_F2_F1** Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.

- VORONOI_CRACKLE Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- CELL_NOISE Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_basis_2

- SIN Sin, Uses a sine wave to produce bands.
- SAW Saw, Uses a saw wave to produce bands.
- TRI Tri, Uses a triangle wave to produce bands.

Type enum in ['SIN', 'SAW', 'TRI'], default 'SIN'

noise_depth

Sets the depth of the cloud calculation

Type int in [0, 30], default 0

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

noise_type

- SOFT_NOISE Soft, Generate soft noise (smooth transitions).
- HARD_NOISE Hard, Generate hard noise (sharp transitions).

Type enum in ['SOFT_NOISE', 'HARD_NOISE'], default 'SOFT_NOISE'

turbulence

Sets the turbulence of the bandnoise and ringnoise types

Type float in [0.0001, inf], default 0.0

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users

- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.315 MaskModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.MaskModifier` (*Modifier*)

Mask modifier to hide parts of the mesh

armature

Armature to use as source of bones to mask

Type Object

invert_vertex_group

Use vertices that are not part of region defined

Type boolean, default False

mode

Type enum in ['VERTEX_GROUP', 'ARMATURE'], default 'VERTEX_GROUP'

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.316 Material(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Material` (*ID*)

Material datablock to define the appearance of geometric objects for rendering

active_node_material

Active node material

Type `Material`

active_texture

Active texture slot being displayed

Type `Texture`

active_texture_index

Index of active texture slot

Type `int` in `[0, 17]`, default `0`

alpha

Alpha transparency of the material

Type `float` in `[0, 1]`, default `0.0`

ambient

Amount of global ambient color the material receives

Type `float` in `[0, 1]`, default `0.0`

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

darkness

Minnaert darkness

Type `float` in `[0, 2]`, default `0.0`

diffuse_color

Diffuse color of the material

Type `float` array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

diffuse_fresnel

Power of Fresnel

Type `float` in `[0, 5]`, default `0.0`

diffuse_fresnel_factor

Blending factor of Fresnel

Type `float` in `[0, 5]`, default `0.0`

diffuse_intensity

Amount of diffuse reflection

Type `float` in `[0, 1]`, default `0.0`

diffuse_ramp

Color ramp used to affect diffuse shading

Type `ColorRamp`, (readonly)

diffuse_ramp_blend

Blending method of the ramp and the diffuse color

Type `enum` in `['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT']`, default `'MIX'`

diffuse_ramp_factor

Blending factor (also uses alpha in Colorband)

Type float in [0, 1], default 0.0

diffuse_ramp_input

Determines how the ramp maps on the surface

Type enum in ['SHADER', 'ENERGY', 'NORMAL', 'RESULT'], default 'SHADER'

diffuse_shader

- LAMBERT Lambert, Use a Lambertian shader.
- OREN_NAYAR Oren-Nayar, Use an Oren-Nayar shader.
- TOON Toon, Use a toon shader.
- MINNAERT Minnaert, Use a Minnaert shader.
- FRESNEL Fresnel, Use a Fresnel shader.

Type enum in ['LAMBERT', 'OREN_NAYAR', 'TOON', 'MINNAERT', 'FRESNEL'], default 'LAMBERT'

diffuse_toon_size

Size of diffuse toon area

Type float in [0, 3.14], default 0.0

diffuse_toon_smooth

Smoothness of diffuse toon area

Type float in [0, 1], default 0.0

emit

Amount of light to emit

Type float in [0, inf], default 0.0

game_settings

Game material settings

Type `MaterialGameSettings`, (readonly, never None)

halo

Halo settings for the material

Type `MaterialHalo`, (readonly, never None)

invert_z

Render material's faces with an inverted Z buffer (scanline only)

Type boolean, default False

light_group

Limit lighting to lamps in this Group

Type `Group`

mirror_color

Mirror color of the material

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

node_tree

Node tree for node based materials

Type `NodeTree`, (readonly)

offset_z

Give faces an artificial offset in the Z buffer for Z transparency

Type float in [-inf, inf], default 0.0

pass_index

Index # for the IndexMA render pass

Type int in [0, 32767], default 0

physics

Game physics settings

Type `MaterialPhysics`, (readonly, never None)

preview_render_type

Type of preview render

- FLAT Flat, Preview type: Flat XY plane.
- SPHERE Sphere, Preview type: Sphere.
- CUBE Flat, Preview type: Cube.
- MONKEY Flat, Preview type: Monkey.
- HAIR Flat, Preview type: Hair strands.
- SPHERE_A Flat, Preview type: Large sphere with sky.

Type enum in ['FLAT', 'SPHERE', 'CUBE', 'MONKEY', 'HAIR', 'SPHERE_A'], default 'FLAT'

raytrace_mirror

Raytraced reflection settings for the material

Type `MaterialRaytraceMirror`, (readonly, never None)

raytrace_transparency

Raytraced transparency settings for the material

Type `MaterialRaytraceTransparency`, (readonly, never None)

roughness

Oren-Nayar Roughness

Type float in [0, 3.14], default 0.0

shadow_buffer_bias

Factor to multiply shadow buffer bias with (0 is ignore.)

Type float in [0, 10], default 0.0

shadow_cast_alpha

Shadow casting alpha, in use for Irregular and Deep shadow buffer

Type float in [0.001, 1], default 0.0

shadow_only_type

How to draw shadows

- SHADOW_ONLY_OLD Shadow and Distance, Old shadow only method.
- SHADOW_ONLY Shadow Only, Improved shadow only method.

- SHADOW_ONLY_SHADED** Shadow and Shading, Improved shadow only method which also renders lightless areas as shadows.

Type enum in ['SHADOW_ONLY_OLD', 'SHADOW_ONLY', 'SHADOW_ONLY_SHADED'], default 'SHADOW_ONLY_OLD'

shadow_ray_bias

Shadow raytracing bias to prevent terminator problems on shadow boundary

Type float in [0, 0.25], default 0.0

specular_alpha

Alpha transparency for specular areas

Type float in [0, 1], default 0.0

specular_color

Specular color of the material

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

specular_hardness

How hard (sharp) the specular reflection is

Type int in [1, 511], default 0

specular_intensity

How intense (bright) the specular reflection is

Type float in [0, 1], default 0.0

specular_ior

Specular index of refraction

Type float in [1, 10], default 0.0

specular_ramp

Color ramp used to affect specular shading

Type `ColorRamp`, (readonly)

specular_ramp_blend

Blending method of the ramp and the specular color

Type enum in ['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

specular_ramp_factor

Blending factor (also uses alpha in Colorband)

Type float in [0, 1], default 0.0

specular_ramp_input

Determines how the ramp maps on the surface

Type enum in ['SHADER', 'ENERGY', 'NORMAL', 'RESULT'], default 'SHADER'

specular_shader

- COOKTORR** CookTorr, Use a Cook-Torrance shader.
- PHONG** Phong, Use a Phong shader.
- BLINN** Blinn, Use a Blinn shader.

- TOON** Toon, Use a toon shader.
- WARDISO** WardIso, Use a Ward anisotropic shader.

Type enum in ['COOKTORR', 'PHONG', 'BLINN', 'TOON', 'WARDISO'], default 'COOKTORR'

specular_slope

The standard deviation of surface slope

Type float in [0, 0.4], default 0.0

specular_toon_size

Size of specular toon area

Type float in [0, 1.53], default 0.0

specular_toon_smooth

Smoothness of specular toon area

Type float in [0, 1], default 0.0

strand

Strand settings for the material

Type `MaterialStrand`, (readonly, never None)

subsurface_scattering

Subsurface scattering settings for the material

Type `MaterialSubsurfaceScattering`, (readonly, never None)

texture_slots

Texture slots defining the mapping and influence of textures

Type `MaterialTextureSlots` `bpy_prop_collection` of `MaterialTextureSlot`, (readonly)

translucency

Amount of diffuse shading on the back side

Type float in [0, 1], default 0.0

transparency_method

Method to use for rendering transparency

- MASK** Mask, Mask the background.
- Z_TRANSPARENCY** Z Transparency, Use alpha buffer for transparent faces.
- RAYTRACE** Raytrace, Use raytracing for transparent refraction rendering.

Type enum in ['MASK', 'Z_TRANSPARENCY', 'RAYTRACE'], default 'MASK'

type

Material type defining how the object is rendered

- SURFACE** Surface, Render object as a surface.
- WIRE** Wire, Render the edges of faces as wires (not supported in raytracing).
- VOLUME** Volume, Render object as a volume.
- HALO** Halo, Render object as halo particles.

Type enum in ['SURFACE', 'WIRE', 'VOLUME', 'HALO'], default 'SURFACE'

use_cast_approximate

Allow this material to cast shadows when using approximate ambient occlusion

Type boolean, default False

use_cast_buffer_shadows

Allow this material to cast shadows from shadow buffer lamps

Type boolean, default False

use_cast_shadows_only

Make objects with this material appear invisible (not rendered), only casting shadows

Type boolean, default False

use_cubic

Use cubic interpolation for diffuse values, for smoother transitions

Type boolean, default False

use_diffuse_ramp

Toggle diffuse ramp operations

Type boolean, default False

use_face_texture

Replace the object's base color with color from face assigned image textures

Type boolean, default False

use_face_texture_alpha

Replace the object's base alpha value with alpha from face assigned image textures

Type boolean, default False

use_full_oversampling

Force this material to render full shading/textures for all anti-aliasing samples

Type boolean, default False

use_light_group_exclusive

Material uses the light group exclusively - these lamps are excluded from other scene lighting

Type boolean, default False

use_mist

Use mist with this material (in world settings)

Type boolean, default False

use_nodes

Use shader nodes to render the material

Type boolean, default False

use_object_color

Modulate the result with a per-object color

Type boolean, default False

use_only_shadow

Render shadows as the material's alpha value, making the material transparent except for shadowed areas

Type boolean, default False

use_ray_shadow_bias

Prevent raytraced shadow errors on surfaces with smooth shaded normals (terminator problem)

Type boolean, default False

use_raytrace

Include this material and geometry that uses it in raytracing calculations

Type boolean, default False

use_shadeless

Make this material insensitive to light or shadow

Type boolean, default False

use_shadows

Allow this material to receive shadows

Type boolean, default False

use_sky

Render this material with zero alpha, with sky background in place (scanline only)

Type boolean, default False

use_specular_ramp

Toggle specular ramp operations

Type boolean, default False

use_tangent_shading

Use the material's tangent vector instead of the normal for shading - for anisotropic shading effects

Type boolean, default False

use_textures

Enable/Disable each texture

Type boolean array of 18 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

use_transparency

Render material as transparent

Type boolean, default False

use_transparent_shadows

Allow this object to receive transparent shadows cast through other objects

Type boolean, default False

use_vertex_color_light

Add vertex colors as additional lighting

Type boolean, default False

use_vertex_color_paint

Replace object base color with vertex colors (multiply with 'texture face' face assigned textures)

Type boolean, default False

volume

Volume settings for the material

Type `MaterialVolume`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.materials`
- `BlendDataMaterials.new`
- `BlendDataMaterials.remove`
- `Curve.materials`
- `DynamicPaintBrushSettings.material`
- `IDMaterials.append`
- `IDMaterials.pop`
- `Material.active_node_material`
- `MaterialSlot.material`
- `Mesh.materials`
- `MetaBall.materials`
- `Object.active_material`
- `RenderLayer.material_override`
- `SceneRenderLayer.material_override`
- `ShaderNodeExtendedMaterial.material`

- `ShaderNodeMaterial.material`
- `TouchSensor.material`

2.4.317 MaterialGameSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MaterialGameSettings` (*bpy_struct*)
Game Engine settings for a Material datablock

alpha_blend

Blend Mode for Transparent Faces

- **OPAQUE** Opaque, Render color of textured face as color.
- **ADD** Add, Render face transparent and add color of face.
- **CLIP** Alpha Clip, Use the image alpha values clipped with no blending (binary alpha).
- **ALPHA** Alpha Blend, Render polygon transparent, depending on alpha channel of the texture.
- **ALPHA_SORT** Alpha Sort, Sort faces for correct alpha drawing (slow, use Alpha Clip instead when possible).

Type enum in ['OPAQUE', 'ADD', 'CLIP', 'ALPHA', 'ALPHA_SORT'], default 'OPAQUE'

face_orientation

Especial face orientation options

- **NORMAL** Normal, No tranformation.
- **HALO** Halo, Screen aligned billboard.
- **BILLBOARD** Billboard, Billboard with Z-axis constraint.
- **SHADOW** Shadow, Faces are used for shadow.

Type enum in ['NORMAL', 'HALO', 'BILLBOARD', 'SHADOW'], default 'NORMAL'

invisible

Make face invisible

Type boolean, default False

physics

Use physics properties of materials

Type boolean, default False

text

Use material as text in Game Engine

Type boolean, default False

use_backface_culling

Hide Back of the face in Game Engine

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.game_settings`

2.4.318 MaterialHalo(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MaterialHalo` (*bpy_struct*)
Halo particle effect settings for a Material datablock

add

Strength of the add effect

Type float in [0, 1], default 0.0

flare_boost

Give the flare extra strength

Type float in [0.1, 10], default 0.0

flare_seed

Offset in the flare seed table

Type int in [0, 255], default 0

flare_size

Factor by which the flare is larger than the halo

Type float in [0.1, 25], default 0.0

flare_subflare_count

Number of sub-flares

Type int in [1, 32], default 0

flare_subflare_size

Dimension of the sub-flares, dots and circles

Type float in [0.1, 25], default 0.0

hardness

Hardness of the halo

Type int in [0, 127], default 0

line_count

Number of star shaped lines rendered over the halo

Type int in [0, 250], default 0

ring_count

Number of rings rendered over the halo

Type int in [0, 24], default 0

seed

Randomize ring dimension and line location

Type int in [0, 255], default 0

size

Dimension of the halo

Type float in [0, 100], default 0.0

star_tip_count

Number of points on the star shaped halo

Type int in [3, 50], default 0

use_extreme_alpha

Use extreme alpha

Type boolean, default False

use_flare_mode

Render halo as a lens flare

Type boolean, default False

use_lines

Render star shaped lines over halo

Type boolean, default False

use_ring

Render rings over halo

Type boolean, default False

use_shaded

Let halo receive light and shadows from external objects

Type boolean, default False

use_soft

Soften the edges of halos at intersections with other geometry

Type boolean, default False

use_star

Render halo as a star

Type boolean, default False

use_texture

Give halo a texture

Type boolean, default False

use_vertex_normal

Use the vertex normal to specify the dimension of the halo

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.halo`

2.4.319 MaterialPhysics(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MaterialPhysics` (*bpy_struct*)
Physics settings for a Material datablock

elasticity

Elasticity of collisions

Type float in [0, 1], default 0.0

fh_damping

Damping of the spring force, when inside the physics distance area

Type float in [0, 1], default 0.0

fh_distance

Distance of the physics area

Type float in [0, 20], default 0.0

fh_force

Upward spring force, when inside the physics distance area

Type float in [0, 1], default 0.0

friction

Coulomb friction coefficient, when inside the physics distance area

Type float in [0, 100], default 0.0

use_fh_normal

Align dynamic game objects along the surface normal, when inside the physics distance area

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.physics`

2.4.320 MaterialRaytraceMirror(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MaterialRaytraceMirror` (*bpy_struct*)

Raytraced reflection settings for a Material datablock

depth

Maximum allowed number of light inter-reflections

Type int in [0, 32767], default 0

distance

Maximum distance of reflected rays (reflections further than this range fade to sky color or material color)

Type float in [0, 10000], default 0.0

fade_to

The color that rays with no intersection within the Max Distance take (material color can be best for indoor scenes, sky color for outdoor)

Type enum in ['FADE_TO_SKY', 'FADE_TO_MATERIAL'], default 'FADE_TO_SKY'

fresnel

Power of Fresnel for mirror reflection

Type float in [0, 5], default 0.0

fresnel_factor

Blending factor for Fresnel

Type float in [0, 5], default 0.0

gloss_anisotropic

The shape of the reflection, from 0.0 (circular) to 1.0 (fully stretched along the tangent)

Type float in [0, 1], default 0.0

gloss_factor

The shininess of the reflection (values < 1.0 give diffuse, blurry reflections)

Type float in [0, 1], default 0.0

gloss_samples

Number of cone samples averaged for blurry reflections

Type int in [0, 1024], default 0

gloss_threshold

Threshold for adaptive sampling (if a sample contributes less than this amount [as a percentage], sampling is stopped)

Type float in [0, 1], default 0.0

reflect_factor

Amount of mirror reflection for raytrace

Type float in [0, 1], default 0.0

use

Enable raytraced reflections

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.raytrace_mirror`

2.4.321 MaterialRaytraceTransparency(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MaterialRaytraceTransparency` (*bpy_struct*)

Raytraced refraction settings for a Material datablock

depth

Maximum allowed number of light inter-refractions

Type int in [0, 32767], default 0

depth_max

Maximum depth for light to travel through the transparent material before becoming fully filtered (0.0 is disabled)

Type float in [0, 100], default 0.0

falloff

Falloff power for transmissivity filter effect (1.0 is linear)

Type float in [0.1, 10], default 0.0

filter

Amount to blend in the material's diffuse color in raytraced transparency (simulating absorption)

Type float in [0, 1], default 0.0

fresnel

Power of Fresnel for transparency (Ray or ZTransp)

Type float in [0, 5], default 0.0

fresnel_factor

Blending factor for Fresnel

Type float in [1, 5], default 0.0

gloss_factor

The clarity of the refraction. Values < 1.0 give diffuse, blurry refractions

Type float in [0, 1], default 0.0

gloss_samples

Number of cone samples averaged for blurry refractions

Type int in [0, 1024], default 0

gloss_threshold

Threshold for adaptive sampling. If a sample contributes less than this amount (as a percentage), sampling is stopped

Type float in [0, 1], default 0.0

ior

Angular index of refraction for raytraced refraction

Type float in [0.25, 4], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.raytrace_transparency`

2.4.322 MaterialSlot(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MaterialSlot` (*bpy_struct*)
 Material slot in an object

link
 Link material to object or the object's data
Type enum in ['OBJECT', 'DATA'], default 'DATA'

material
 Material datablock used by this material slot
Type `Material`

name
 Material slot name
Type string, default "", (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.material_slots`

2.4.323 MaterialStrand(*bpy_struct*)

base class — `bpy_struct`

class `bpy.types.MaterialStrand` (*bpy_struct*)
 Strand settings for a Material datablock

blend_distance
 Worldspace distance over which to blend in the surface normal

Type float in [0, 10], default 0.0

root_size

Start size of strands in pixels or Blender units

Type float in [0, inf], default 0.0

shape

Positive values make strands rounder, negative ones make strands spiky

Type float in [-0.9, 0.9], default 0.0

size_min

Minimum size of strands in pixels

Type float in [0.001, 10], default 0.0

tip_size

End size of strands in pixels or Blender units

Type float in [0, inf], default 0.0

use_blender_units

Use Blender units for widths instead of pixels

Type boolean, default False

use_surface_diffuse

Make diffuse shading more similar to shading the surface

Type boolean, default False, (readonly)

use_tangent_shading

Uses direction of strands as normal for tangent-shading

Type boolean, default False

uv_layer

Name of UV layer to override

Type string, default ""

width_fade

Transparency along the width of the strand

Type float in [0, 2], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.strand`

2.4.324 MaterialSubsurfaceScattering(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MaterialSubsurfaceScattering` (*`bpy_struct`*)

Diffuse subsurface scattering settings for a Material datablock

back

Back scattering weight

Type float in [0, 10], default 0.0

color

Scattering color

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

color_factor

Blend factor for SSS colors

Type float in [0, 1], default 0.0

error_threshold

Error tolerance (low values are slower and higher quality)

Type float in [-inf, inf], default 0.0

front

Front scattering weight

Type float in [0, 2], default 0.0

ior

Index of refraction (higher values are denser)

Type float in [-inf, inf], default 0.0

radius

Mean red/green/blue scattering path length

Type float array of 3 items in [0.001, inf], default (0.0, 0.0, 0.0)

scale

Object scale factor

Type float in [-inf, inf], default 0.0

texture_factor

Texture scattering blend factor

Type float in [0, 1], default 0.0

use

Enable diffuse subsurface scattering effects in a material

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.subsurface_scattering`

2.4.325 MaterialTextureSlot(TextureSlot)

base classes — `bpy_struct`, `TextureSlot`

class `bpy.types.MaterialTextureSlot` (*TextureSlot*)

Texture slot for textures in a Material datablock

alpha_factor

Amount texture affects alpha

Type float in [-inf, inf], default 0.0

ambient_factor

Amount texture affects ambient

Type float in [-inf, inf], default 0.0

bump_method

Method to use for bump mapping

Type enum in ['BUMP_ORIGINAL', 'BUMP_COMPATIBLE', 'BUMP_DEFAULT', 'BUMP_BEST_QUALITY'], default 'BUMP_ORIGINAL'

bump_objectspace

Space to apply bump mapping in

Type enum in ['BUMP_VIEWSPACE', 'BUMP_OBJECTSPACE', 'BUMP_TEXTURESPACE'], default 'BUMP_VIEWSPACE'

density_factor

Amount texture affects density

Type float in [-inf, inf], default 0.0

diffuse_color_factor

Amount texture affects diffuse color

Type float in [-inf, inf], default 0.0

diffuse_factor

Amount texture affects diffuse reflectivity

Type float in [-inf, inf], default 0.0

displacement_factor

Amount texture displaces the surface

Type float in [-inf, inf], default 0.0

emission_color_factor

Amount texture affects emission color

Type float in [-inf, inf], default 0.0

emission_factor

Amount texture affects emission

Type float in [-inf, inf], default 0.0

emit_factor

Amount texture affects emission

Type float in [-inf, inf], default 0.0

hardness_factor

Amount texture affects hardness

Type float in [-inf, inf], default 0.0

mapping

- FLAT Flat, Map X and Y coordinates directly.
- CUBE Cube, Map using the normal vector.
- TUBE Tube, Map with Z as central axis.
- SPHERE Sphere, Map with Z as central axis.

Type enum in ['FLAT', 'CUBE', 'TUBE', 'SPHERE'], default 'FLAT'

mapping_x

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_y

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_z

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mirror_factor

Amount texture affects mirror color

Type float in [-inf, inf], default 0.0

normal_factor

Amount texture affects normal values

Type float in [-inf, inf], default 0.0

normal_map_space

Set space of normal map image

Type enum in ['CAMERA', 'WORLD', 'OBJECT', 'TANGENT'], default 'CAMERA'

object

Object to use for mapping with Object texture coordinates

Type *Object*

raymir_factor

Amount texture affects ray mirror

Type float in [-inf, inf], default 0.0

reflection_color_factor

Amount texture affects color of out-scattered light

Type float in [-inf, inf], default 0.0

reflection_factor

Amount texture affects brightness of out-scattered light

Type float in [-inf, inf], default 0.0

scattering_factor

Amount texture affects scattering

Type float in [-inf, inf], default 0.0

specular_color_factor

Amount texture affects specular color

Type float in [-inf, inf], default 0.0

specular_factor

Amount texture affects specular reflectivity

Type float in [-inf, inf], default 0.0

texture_coords

- GLOBAL Global, Uses global coordinates for the texture coordinates.
- OBJECT Object, Uses linked object's coordinates for texture coordinates.
- UV UV, Uses UV coordinates for texture coordinates.

- ORCO Generated, Uses the original undeformed coordinates of the object.
- STRAND Strand / Particle, Uses normalized strand texture coordinate (1D) or particle age (X) and trail position (Y).
- STICKY Sticky, Uses mesh's sticky coordinates for the texture coordinates.
- WINDOW Window, Uses screen coordinates as texture coordinates.
- NORMAL Normal, Uses normal vector as texture coordinates.
- REFLECTION Reflection, Uses reflection vector as texture coordinates.
- STRESS Stress, Uses the difference of edge lengths compared to original coordinates of the mesh.
- TANGENT Tangent, Uses the optional tangent vector as texture coordinates.

Type enum in ['GLOBAL', 'OBJECT', 'UV', 'ORCO', 'STRAND', 'STICKY', 'WINDOW', 'NORMAL', 'REFLECTION', 'STRESS', 'TANGENT'], default 'GLOBAL'

translucency_factor

Amount texture affects translucency

Type float in [-inf, inf], default 0.0

transmission_color_factor

Amount texture affects result color after light has been scattered/absorbed

Type float in [-inf, inf], default 0.0

use

Enable this material texture slot

Type boolean, default False

use_from_dupli

Dupli's instanced from verts, faces or particles, inherit texture coordinate from their parent

Type boolean, default False

use_from_original

Dupli's derive their object coordinates from the original object's transformation

Type boolean, default False

use_map_alpha

Causes the texture to affect the alpha value

Type boolean, default False

use_map_ambient

Causes the texture to affect the value of ambient

Type boolean, default False

use_map_color_diffuse

Causes the texture to affect basic color of the material

Type boolean, default False

use_map_color_emission

Causes the texture to affect the color of emission

Type boolean, default False

use_map_color_reflection

Causes the texture to affect the color of scattered light

Type boolean, default False

use_map_color_spec

Causes the texture to affect the specular color

Type boolean, default False

use_map_color_transmission

Causes the texture to affect the result color after other light has been scattered/absorbed

Type boolean, default False

use_map_density

Causes the texture to affect the volume's density

Type boolean, default False

use_map_diffuse

Causes the texture to affect the value of the materials diffuse reflectivity

Type boolean, default False

use_map_displacement

Let the texture displace the surface

Type boolean, default False

use_map_emission

Causes the texture to affect the volume's emission

Type boolean, default False

use_map_emit

Causes the texture to affect the emit value

Type boolean, default False

use_map_hardness

Causes the texture to affect the hardness value

Type boolean, default False

use_map_mirror

Causes the texture to affect the mirror color

Type boolean, default False

use_map_normal

Causes the texture to affect the rendered normal

Type boolean, default False

use_map_raymir

Causes the texture to affect the ray-mirror value

Type boolean, default False

use_map_reflect

Causes the texture to affect the reflected light's brightness

Type boolean, default False

use_map_scatter

Causes the texture to affect the volume's scattering

Type boolean, default False

use_map_specular

Causes the texture to affect the value of specular reflectivity

Type boolean, default False

use_map_translucency

Causes the texture to affect the translucency value

Type boolean, default False

use_map_warp

Let the texture warp texture coordinates of next channels

Type boolean, default False

uv_layer

UV layer to use for mapping with UV texture coordinates

Type string, default ""

warp_factor

Amount texture affects texture coordinates of next channels

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `TextureSlot.name`
- `TextureSlot.blend_type`
- `TextureSlot.color`
- `TextureSlot.default_value`
- `TextureSlot.invert`
- `TextureSlot.offset`
- `TextureSlot.output_node`
- `TextureSlot.use_rgb_to_intensity`
- `TextureSlot.scale`
- `TextureSlot.use_stencil`
- `TextureSlot.texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.texture_slots`
- `MaterialTextureSlots.add`
- `MaterialTextureSlots.create`

2.4.326 MaterialTextureSlots(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MaterialTextureSlots` (*bpy_struct*)

Collection of texture slots

classmethod `add()`

`add`

Returns The newly initialized `mtx`

Return type `MaterialTextureSlot`

classmethod `create(index)`

`create`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to initialize

Returns The newly initialized `mtx`

Return type `MaterialTextureSlot`

classmethod `clear(index)`

`clear`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to clear

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.texture_slots`

2.4.327 MaterialVolume(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MaterialVolume` (*bpy_struct*)

Volume rendering settings for a Material datablock

asymmetry

Back scattering (-1.0) to Forward scattering (1.0) and the range in between

Type float in [-1, 1], default 0.0

cache_resolution

Resolution of the voxel grid, low resolutions are faster, high resolutions use more memory

Type int in [1, 1024], default 0

density

The base density of the volume

Type float in [0, 1], default 0.0

density_scale

Multiplier for the material's density

Type float in [0, inf], default 0.0

depth_threshold

Stop ray marching early if transmission drops below this luminance - higher values give speedups in dense volumes at the expense of accuracy

Type float in [0, 1], default 0.0

emission

Amount of light that gets emitted by the volume

Type float in [0, inf], default 0.0

emission_color

Color of emitted light

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

light_method

Method of shading, attenuating, and scattering light through the volume

- **SHADELESS** Shadeless, Do not calculate lighting and shadows.
- **SHADOWED** Shadowed.
- **SHADED** Shaded.

- MULTIPLE_SCATTERING Multiple Scattering.
- SHADED_PLUS_MULTIPLE_SCATTERING Shaded + Multiple Scattering.

Type enum in ['SHADELESS', 'SHADOWED', 'SHADED', 'MULTIPLE_SCATTERING', 'SHADED_PLUS_MULTIPLE_SCATTERING'], default 'SHADELESS'

ms_diffusion

Diffusion factor, the strength of the blurring effect

Type float in [0, inf], default 0.0

ms_intensity

Multiplier for multiple scattered light energy

Type float in [0, inf], default 0.0

ms_spread

Proportional distance over which the light is diffused

Type float in [0, inf], default 0.0

reflection

Multiplier to make out-scattered light brighter or darker (non-physically correct)

Type float in [0, inf], default 0.0

reflection_color

Color of light scattered out of the volume (does not affect transmission)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scattering

Amount of light that gets scattered out by the volume - the more out-scattering, the shallower the light will penetrate

Type float in [0, inf], default 0.0

step_method

Method of calculating the steps through the volume

Type enum in ['RANDOMIZED', 'CONSTANT'], default 'RANDOMIZED'

step_size

Distance between subsequent volume depth samples

Type float in [0, inf], default 0.0

transmission_color

Result color of the volume, after other light has been scattered/absorbed

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

use_external_shadows

Receive shadows from sources outside the volume (temporary)

Type boolean, default False

use_light_cache

Pre-calculate the shading information into a voxel grid, speeds up shading at slightly less accuracy

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Material.volume`

2.4.328 Menu(`bpy_struct`)

Basic Menu Example

This script is a simple menu, menus differ from panels in that they must reference from a header, panel or another menu.

Notice the ‘CATEGORY_MT_name’ `Menu.bl_idname`, this is a naming convention for menus.

Note: Menu subclasses must be registered before referencing them from blender.

Note: Menu’s have their `Layout.operator_context` initialized as ‘EXEC_REGION_WIN’ rather than ‘INVOKE_DEFAULT’, so if the operator context needs to initialize inputs from the `Operator.invoke` function then this needs to be explicitly set.

```
import bpy

class BasicMenu(bpy.types.Menu):
    bl_idname = "OBJECT_MT_select_test"
    bl_label = "Select"

    def draw(self, context):
```

```
        layout = self.layout

        layout.operator("object.select_all", text="Select/Deselect All")
        layout.operator("object.select_inverse", text="Inverse")
        layout.operator("object.select_random", text="Random")

bpy.utils.register_class(BasicMenu)

# test call to display immediately.
bpy.ops.wm.call_menu(name="OBJECT_MT_select_test")
```

Submenus

This menu demonstrates some different functions.

```
import bpy
```

```
class SubMenu(bpy.types.Menu):
    bl_idname = "OBJECT_MT_select_submenu"
    bl_label = "Select"

    def draw(self, context):
        layout = self.layout

        layout.operator("object.select_all", text="Select/Deselect All")
        layout.operator("object.select_inverse", text="Inverse")
        layout.operator("object.select_random", text="Random")

        # access this operator as a submenu
        layout.operator_menu_enum("object.select_by_type", "type", text="Select All by Type...")

        layout.separator()

        # expand each operator option into this menu
        layout.operator_enum("object.lamp_add", "type")

        layout.separator()

        # use existing menu
        layout.menu("VIEW3D_MT_transform")

bpy.utils.register_class(SubMenu)

# test call to display immediately.
bpy.ops.wm.call_menu(name="OBJECT_MT_select_submenu")
```

Extending Menus

When creating menus for addons you can't reference menus in blenders default scripts.

Instead the addon can add menu items to existing menus.

The function `menu_draw` acts like `Menu.draw`


```
import bpy
```

```
def menu_draw(self, context):
    self.layout.operator("wm.save_homefile")
```

```
bpy.types.INFO_MT_file.append(menu_draw)
```

base class — `bpy_struct`

class `bpy.types.Menu` (*bpy_struct*)
Editor menu containing buttons

bl_description

Type string, default ""

bl_idname

If this is set, the menu gets a custom ID, otherwise it takes the name of the class used to define the menu (for example, if the class name is "OBJECT_MT_hello", and bl_idname is not set by the script, then bl_idname = "OBJECT_MT_hello")

Type string, default ""

bl_label

The menu label

Type string, default ""

layout

Defines the structure of the menu in the UI

Type `UILayout`, (readonly)

classmethod poll (*context*)

If this method returns a non-null output, then the menu can be drawn

Return type boolean

draw (*context*)

Draw UI elements into the menu UI layout

classmethod append (*draw_func*)

Append a draw function to this menu, takes the same arguments as the menus draw function

draw_preset (*context*)

Define these on the subclass - preset_operator - preset_subdir

path_menu (*searchpaths, operator, props_default={}*)

classmethod prepend (*draw_func*)

Prepend a draw function to this menu, takes the same arguments as the menus draw function

classmethod remove (*draw_func*)

Remove a draw function that has been added to this menu

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.329 Mesh(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Mesh` (*ID*)

Mesh datablock defining geometric surfaces

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

auto_smooth_angle

Maximum angle between face normals that ‘Auto Smooth’ will operate on

Type float in [-inf, inf], default 0.0

edges

Edges of the mesh

Type `MeshEdges` `bpy_prop_collection` of `MeshEdge`, (readonly)

faces

Faces of the mesh

Type `MeshFaces` `bpy_prop_collection` of `MeshFace`, (readonly)

layers_float

Type `FloatProperties` `bpy_prop_collection` of `MeshFloatPropertyLayer`, (readonly)

layers_int

Type `IntProperties` `bpy_prop_collection` of `MeshIntPropertyLayer`, (readonly)

layers_string

Type `StringProperties` `bpy_prop_collection` of `MeshStringPropertyLayer`, (readonly)

materials

Type `IDMaterials bpy_prop_collection` of `Material`, (readonly)

shape_keys

Type `Key`, (readonly)

show_all_edges

Display all edges for wireframe in all view modes in the 3D view

Type boolean, default False

show_double_sided

Render/display the mesh with double or single sided lighting

Type boolean, default False

show_edge_bevel_weight

Display weights created for the Bevel modifier

Type boolean, default False

show_edge_crease

Display creases created for subsurf weighting

Type boolean, default False

show_edge_seams

Display UV unwrapping seams

Type boolean, default False

show_edge_sharp

Display sharp edges, used with the EdgeSplit modifier

Type boolean, default False

show_edges

Display selected edges using highlights in the 3D view and UV editor

Type boolean, default False

show_extra_edge_length

Display selected edge lengths, using global values when set in the transform panel

Type boolean, default False

show_extra_face_angle

Display the angles between the selected edges in degrees, using global values when set in the transform panel

Type boolean, default False

show_extra_face_area

Display the area of selected faces, using global values when set in the transform panel

Type boolean, default False

show_faces

Display all faces as shades in the 3D view and UV editor

Type boolean, default False

show_normal_face

Display face normals as lines

Type boolean, default False

show_normal_vertex

Display vertex normals as lines

Type boolean, default False

sticky

Sticky texture coordinates

Type bpy_prop_collection of MeshSticky, (readonly)

texco_mesh

Derive texture coordinates from another mesh

Type Mesh

texspace_location

Texture space location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

texspace_size

Texture space size

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

texture_mesh

Use another mesh for texture indices (vertex indices must be aligned)

Type Mesh

total_edge_sel

Selected edge count in editmode

Type int in [0, inf], default 0, (readonly)

total_face_sel

Selected face count in editmode

Type int in [0, inf], default 0, (readonly)

total_vert_sel

Selected vertex count in editmode

Type int in [0, inf], default 0, (readonly)

use_auto_smooth

Treat all set-smoothed faces with angles less than the specified angle as 'smooth' during render

Type boolean, default False

use_auto_texspace

Adjust active object's texture space automatically when transforming object

Type boolean, default False

use_mirror_topology

Use topology based mirroring (for when both sides of mesh have matching, unique topology)

Type boolean, default False

use_mirror_x

X Axis mirror editing

Type boolean, default False

- use_paint_mask**
Face selection masking for painting
Type boolean, default False
- use_paint_mask_vertex**
Vertex selection masking for painting (weight paint only)
Type boolean, default False
- uv_texture_clone**
UV texture to be used as cloning source
Type `MeshTextureFaceLayer`
- uv_texture_clone_index**
Clone UV texture index
Type int in [0, inf], default 0
- uv_texture_stencil**
UV texture to mask the painted area
Type `MeshTextureFaceLayer`
- uv_texture_stencil_index**
Mask UV texture index
Type int in [0, inf], default 0
- uv_textures**
Type `UVTextures bpy_prop_collection of MeshTextureFaceLayer`, (readonly)
- vertex_colors**
Type `VertexColors bpy_prop_collection of MeshColorLayer`, (readonly)
- vertices**
Vertices of the mesh
Type `MeshVertices bpy_prop_collection of MeshVertex`, (readonly)
- edge_keys**
(readonly)
- ttransform** (*matrix*)
Transform mesh vertices by a matrix
Parameters `matrix` (*float array of 16 items in [-inf, inf]*) – Matrix
- calc_normals** ()
Calculate vertex normals
- update** (*calc_edges=False*)
update
Parameters `calc_edges` (*boolean, (optional)*) – Calculate Edges, Force recalculation of edges
- validate** (*verbose=False*)
validate geometry, return True when the mesh has had invalid geometry corrected/removed
Parameters `verbose` (*boolean, (optional)*) – Verbose, Output information about the errors found
Returns Result
Return type boolean

from_pydata (*vertices, edges, faces*)

Make a mesh from a list of vertices/edges/faces Until we have a nicer way to make geometry, use this.

Parameters

- **vertices** (*iterable object*) – float triplets each representing (X, Y, Z) eg: [(0.0, 1.0, 0.5), ...].
- **edges** (*iterable object*) – int pairs, each pair contains two indices to the *vertices* argument. eg: [(1, 2), ...]
- **faces** (*iterable object*) – iterator of faces, each faces contains three or four indices to the *vertices* argument. eg: [(5, 6, 8, 9), (1, 2, 3), ...]

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.meshes`
- `BlendDataMeshes.new`
- `BlendDataMeshes.remove`

- `EditObjectActuator.mesh`
- `Mesh.texco_mesh`
- `Mesh.texture_mesh`
- `Object.to_mesh`

2.4.330 MeshColor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshColor` (*bpy_struct*)

Vertex colors for a face in a Mesh

color1

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

color2

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

color3

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

color4

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MeshColorLayer.data`

2.4.331 MeshColorLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshColorLayer` (*bpy_struct*)

Layer of vertex colors in a Mesh datablock

active

Sets the layer as active for display and editing

Type boolean, default False

active_render

Sets the layer as active for rendering

Type boolean, default False

data

Type `bpy_prop_collection` of `MeshColor`, (readonly)

name

Name of Vertex color layer

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.vertex_colors`
- `VertexColors.active`
- `VertexColors.new`

2.4.332 MeshDeformModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.MeshDeformModifier` (*Modifier*)

Mesh deformation modifier to deform with other meshes

invert_vertex_group

Invert vertex group influence

Type boolean, default False

is_bound

Whether geometry has been bound to control cage

Type boolean, default False, (readonly)

object

Mesh object to deform with

Type `Object`

precision

The grid size for binding

Type int in [2, 10], default 0

use_dynamic_bind

Recompute binding dynamically on top of other deformers (slower and more memory consuming.)

Type boolean, default False

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.333 MeshEdge(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshEdge` (*bpy_struct*)
Edge in a Mesh datablock

bevel_weight

Weight used by the Bevel modifier

Type float in [-inf, inf], default 0.0

crease

Weight used by the Subsurf modifier for creasing

Type float in [-inf, inf], default 0.0

hide

Type boolean, default False

index

Index number of the vertex

Type int in [0, inf], default 0, (readonly)

is_fgon

Fgon edge

Type boolean, default False

is_loose

Loose edge

Type boolean, default False

select

Type boolean, default False

use_edge_sharp

Sharp edge for the EdgeSplit modifier

Type boolean, default False

use_seam

Seam edge for UV unwrapping

Type boolean, default False

vertices

Vertex indices

Type int array of 2 items in [0, inf], default (0, 0)

key
(readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.edges`

2.4.334 MeshEdges(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshEdges` (*bpy_struct*)
Collection of mesh edges

add (*count=0*)
add

Parameters `count` (*int in [0, inf], (optional)*) – Count, Number of vertices to add

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.edges`

2.4.335 MeshFace(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshFace` (*bpy_struct*)

Face in a Mesh datablock

area

Read only area of the face

Type float in [0, inf], default 0.0, (readonly)

hide

Type boolean, default False

index

Index number of the vertex

Type int in [0, inf], default 0, (readonly)

material_index

Type int in [0, 32767], default 0

normal

Local space unit length normal vector for this face

Type float array of 3 items in [-1, 1], default (0.0, 0.0, 0.0), (readonly)

select

Type boolean, default False

use_smooth

Type boolean, default False

vertices

Vertex indices

Type int array of 4 items in [0, inf], default (0, 0, 0, 0)

vertices_raw

Fixed size vertex indices array

Type int array of 4 items in [0, inf], default (0, 0, 0, 0)**center**

The midpoint of the face. (readonly)

edge_keys

(readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.faces`

2.4.336 MeshFaces(bpy_struct)base class — `bpy_struct`**class** `bpy.types.MeshFaces` (*bpy_struct*)

Collection of mesh faces

active

The active face for this mesh

Type int in [-inf, inf], default 0**active_tface**

Active Texture Face

Type `MeshTextureFace`, (readonly)

```
add (count=0)  
    add
```

Parameters **count** (*int in [0, inf], (optional)*) – Count, Number of vertices to add

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.faces`

2.4.337 MeshFloatProperty(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MeshFloatProperty` (*bpy_struct*)
User defined floating point number value in a float properties layer

value

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MeshFloatPropertyLayer.data`

2.4.338 MeshFloatPropertyLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshFloatPropertyLayer` (*bpy_struct*)

User defined layer of floating pointer number values

data

Type `bpy_prop_collection` of `MeshFloatProperty`, (readonly)

name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `FloatProperties.new`
- `Mesh.layers_float`

2.4.339 MeshIntProperty(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshIntProperty` (*bpy_struct*)

User defined integer number value in an integer properties layer

value

Type `int` in `[-inf, inf]`, default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MeshIntPropertyLayer.data`

2.4.340 MeshIntPropertyLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshIntPropertyLayer` (*bpy_struct*)

User defined layer of integer number values

data

Type `bpy_prop_collection` of `MeshIntProperty`, (readonly)

name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `IntProperties.new`
- `Mesh.layers_int`

2.4.341 MeshSticky(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshSticky` (*bpy_struct*)

Sticky texture coordinate

co

Sticky texture coordinate location

Type float array of 2 items in `[-inf, inf]`, default (0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.sticky`

2.4.342 MeshStringProperty(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshStringProperty` (*bpy_struct*)
User defined string text value in a string properties layer

value

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MeshStringPropertyLayer.data`

2.4.343 MeshStringPropertyLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshStringPropertyLayer` (*bpy_struct*)
User defined layer of string text values

data

Type `bpy_prop_collection` of `MeshStringProperty`, (readonly)

name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.layers_string`
- `StringProperties.new`

2.4.344 MeshTextureFace(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshTextureFace` (*bpy_struct*)

UV mapping, texturing and game engine data for a face

image

Type `Image`

pin_uv

Type boolean array of 4 items, default (False, False, False, False)

select_uv

Type boolean array of 4 items, default (False, False, False, False)

uv

Type float array of 8 items in `[-inf, inf]`, default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

uv1

Type float array of 2 items in `[-inf, inf]`, default (0.0, 0.0)

uv2

Type float array of 2 items in `[-inf, inf]`, default (0.0, 0.0)

uv3

Type float array of 2 items in `[-inf, inf]`, default (0.0, 0.0)

uv4

Type float array of 2 items in `[-inf, inf]`, default (0.0, 0.0)

uv_raw

Fixed size UV coordinates array

Type float array of 8 items in `[-inf, inf]`, default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MeshFaces.active_tface`
- `MeshTextureFaceLayer.data`

2.4.345 MeshTextureFaceLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshTextureFaceLayer` (*bpy_struct*)

Layer of texture faces in a Mesh datablock

active

Set the layer as active for display and editing

Type boolean, default False

active_clone

Set the layer as active for cloning

Type boolean, default False

active_render

Set the layer as active for rendering

Type boolean, default False

data

Type `bpy_prop_collection` of `MeshTextureFace`, (readonly)

name

Name of UV unwrapping layer

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.uv_texture_clone`
- `Mesh.uv_texture_stencil`
- `Mesh.uv_textures`
- `UVTextures.active`
- `UVTextures.new`

2.4.346 MeshVertex(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshVertex` (*bpy_struct*)

Vertex in a Mesh datablock

bevel_weight

Weight used by the Bevel modifier ‘Only Vertices’ option

Type float in [-inf, inf], default 0.0

co

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

groups

Weights for the vertex groups this vertex is member of

Type `bpy_prop_collection` of `VertexGroupElement`, (readonly)

hide

Type boolean, default False

index

Index number of the vertex

Type int in [0, inf], default 0, (readonly)

normal

Vertex Normal

Type float array of 3 items in [-1, 1], default (0.0, 0.0, 0.0)

select

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.vertices`

2.4.347 MeshVertices(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MeshVertices` (*bpy_struct*)
Collection of mesh vertices

add (*count=0*)
add

Parameters `count` (*int in [0, inf], (optional)*) – Count, Number of vertices to add

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.vertices`

2.4.348 MessageActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.MessageActuator` (*Actuator*)

body_message

Optional, message body Text

Type string, default ""

body_property

The message body will be set by the Property Value

Type string, default ""

body_type

Toggle message type: either Text or a PropertyName

Type enum in ['TEXT', 'PROPERTY'], default 'TEXT'

subject

Optional, message subject (this is what can be filtered on)

Type string, default ""

to_property

Optional, send message to objects with this name only, or empty to broadcast

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.349 MessageSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.MessageSensor` (*Sensor*)

Sensor to detect incoming messages

subject

Optional subject filter: only accept messages with this subject, or empty for all

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.350 MetaBall(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.MetaBall` (*ID*)

Metaball datablock to defined blobby surfaces

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

elements

Meta elements

Type `MetaBallElements` `bpy_prop_collection` of `MetaElement`, (readonly)

materials

Type `IDMaterials` `bpy_prop_collection` of `Material`, (readonly)

render_resolution

Polygonization resolution in rendering

Type float in [0.05, 1], default 0.0

resolution

Polygonization resolution in the 3D viewport

Type float in [0.05, 1], default 0.0

texspace_location

Texture space location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

texspace_size

Texture space size

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

threshold

Influence of meta elements

Type float in [0, 5], default 0.0

update_method

Metaball edit update behavior

- `UPDATE_ALWAYS` Always, While editing, update metaball always.
- `HALFRES` Half, While editing, update metaball in half resolution.
- `FAST` Fast, While editing, update metaball without polygonization.
- `NEVER` Never, While editing, don't update metaball at all.

Type enum in [`'UPDATE_ALWAYS'`, `'HALFRES'`, `'FAST'`, `'NEVER'`], default `'UPDATE_ALWAYS'`

use_auto_texspace

Adjusts active object's texture space automatically when transforming object

Type boolean, default `False`

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.metaballs`
- `BlendDataMetaBalls.new`
- `BlendDataMetaBalls.remove`

2.4.351 MetaBallElements(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MetaBallElements` (*bpy_struct*)

Collection of metaball elements

active

Last selected element

Type `MetaElement`, (readonly)

new (*type='BALL'*)

Add a new spline to the curve

Parameters *type* (*enum in ['BALL', 'CAPSULE', 'PLANE', 'ELLIPSOID', 'CUBE'], (optional)*) – type for the new meta-element

Returns The newly created meta-element

Return type `MetaElement`

remove (*element*)

Remove a spline from a curve

Parameters *element* (`MetaElement`, (never None)) – The element to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MetaBall.elements`

2.4.352 `MetaElement(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.MetaElement` (*bpy_struct*)
 Blobby element in a MetaBall datablock

co

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

hide

Hide element

Type boolean, default False

radius

Type float in [0, inf], default 0.0

rotation

Normalized quaternion rotation

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

size_x

Size of element, use of components depends on element type

Type float in [0, 20], default 0.0

size_y

Size of element, use of components depends on element type

Type float in [0, 20], default 0.0

size_z

Size of element, use of components depends on element type

Type float in [0, 20], default 0.0

stiffness

Stiffness defines how much of the element to fill

Type float in [0, 10], default 0.0

type

Metaball types

Type enum in ['BALL', 'CAPSULE', 'PLANE', 'ELLIPSOID', 'CUBE'], default 'BALL'

use_negative

Set metaball as negative one

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MetaBall.elements`
- `MetaBallElements.active`
- `MetaBallElements.new`
- `MetaBallElements.remove`

2.4.353 MetaSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.MetaSequence` (*Sequence*)
Sequence strip to group other strips as a single sequence strip

animation_offset_end
Animation end offset (trim end)
Type `int` in `[0, inf]`, default `0`

animation_offset_start
Animation start offset (trim start)
Type `int` in `[0, inf]`, default `0`

color_balance
Type `SequenceColorBalance`, (readonly)

color_multiply
Type `float` in `[0, 20]`, default `0.0`

color_saturation
Type `float` in `[0, 20]`, default `0.0`

crop
Type `SequenceCrop`, (readonly)

proxy

Type `SequenceProxy`, (readonly)

sequences

Type `bpy_prop_collection` of `Sequence`, (readonly)

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

transform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.354 MirrorModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.MirrorModifier` (*Modifier*)

Mirroring modifier

merge_threshold

Distance from axis within which mirrored vertices are merged

Type float in [0, inf], default 0.0

mirror_object

Object to use as mirror

Type `Object`

use_clip

Prevents vertices from going through the mirror during transform

Type boolean, default False

use_mirror_merge

Merge vertices within the merge threshold

Type boolean, default False

use_mirror_u

Mirror the U texture coordinate around the 0.5 point

Type boolean, default False

use_mirror_v

Mirror the V texture coordinate around the 0.5 point

Type boolean, default False

use_mirror_vertex_groups

Mirror vertex groups (e.g. .R->.L)

Type boolean, default False

use_x

Enable X axis mirror

Type boolean, default False

use_y

Enable Y axis mirror

Type boolean, default False

use_z

Enable Z axis mirror

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.355 Modifier(`bpy_struct`)

base class — `bpy_struct`

subclasses — `FluidSimulationModifier`, `BevelModifier`, `SolidifyModifier`, `SmokeModifier`, `UVProjectModifier`, `VertexWeightProximityModifier`, `VertexWeightEditModifier`, `DecimateModifier`, `ExplodeModifier`, `SmoothModifier`, `HookModifier`, `SoftBodyModifier`, `BooleanModifier`, `ArrayModifier`, `LatticeModifier`, `BuildModifier`, `ClothModifier`, `DynamicPaintModifier`, `ParticleSystemModifier`, `SubsurfModifier`, `CurveModifier`, `ScrewModifier`, `MaskModifier`, `ShrinkwrapModifier`, `CollisionModifier`, `CastModifier`, `WaveModifier`, `ParticleInstanceModifier`, `SurfaceModifier`, `SimpleDeformModifier`, `DisplaceModifier`, `OceanModifier`, `ArmatureModifier`, `MeshDeformModifier`, `WarpModifier`, `EdgeSplitModifier`, `MultiresModifier`, `MirrorModifier`, `VertexWeightMixModifier`

class `bpy.types.Modifier` (*bpy_struct*)

Modifier affecting the geometry data of an object

name

Modifier name

Type string, default ""

show_expanded

Set modifier expanded in the user interface

Type boolean, default False

show_in_editmode

Use modifier while in the edit mode

Type boolean, default False

show_on_cage

Enable direct editing of modifier control cage

Type boolean, default False

show_render

Use modifier during rendering

Type boolean, default False

show_viewport

Realtime display of a modifier

Type boolean, default False

type

Type enum in ['UV_PROJECT', 'VERTEX_WEIGHT_EDIT', 'VERTEX_WEIGHT_MIX', 'VERTEX_WEIGHT_PROXIMITY', 'ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SOLIDIFY', 'SUBSURF', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH_DEFORM', 'SHRINKWRAP', 'SIMPLE_DEFORM', 'SMOOTH', 'WARP', 'WAVE', 'CLOTH', 'COLLISION', 'DYNAMIC_PAINT', 'EXPLODE', 'FLUID_SIMULATION', 'OCEAN', 'PARTICLE_INSTANCE', 'PARTICLE_SYSTEM', 'SMOKE', 'SOFT_BODY', 'SURFACE'], default 'UV_PROJECT', (readonly)

use_apply_on_spline

Apply this and all preceding deformation modifiers on splines' points rather than on filled curve/surface

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.modifiers`
- `ObjectModifiers.new`
- `ObjectModifiers.remove`
- `UILayout.template_modifier`

2.4.356 MotionPath(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MotionPath` (*bpy_struct*)

Cache of the workspace positions of an element over a frame range

frame_end

End frame of the stored range

Type `int` in `[-inf, inf]`, default 0, (readonly)

frame_start

Starting frame of the stored range

Type `int` in `[-inf, inf]`, default 0, (readonly)

is_modified

Path is being edited

Type `boolean`, default False

length

Number of frames cached

Type `int` in `[-inf, inf]`, default 0, (readonly)

points

Cached positions per frame

Type `bpy_prop_collection` of `MotionPathVert`, (readonly)

use_bone_head

For PoseBone paths, use the bone head location when calculating this path

Type `boolean`, default False, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.motion_path`
- `PoseBone.motion_path`

2.4.357 MotionPathVert(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MotionPathVert` (*bpy_struct*)

Cached location on path

co

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

select

Path point is selected for editing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MotionPath.points`

2.4.358 MouseSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.MouseSensor` (*Sensor*)
Sensor to detect mouse events

mouse_event

Specify the type of event this mouse sensor should trigger on

Type enum in ['LEFTCLICK', 'MIDDLECLICK', 'RIGHTCLICK', 'WHEELUP', 'WHEEL-DOWN', 'MOVEMENT', 'MOUSEOVER', 'MOUSEOVERANY'], default 'LEFTCLICK'

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.359 MovieClip(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.MovieClip` (*ID*)

MovieClip datablock referencing an external movie file

display_aspect

Display Aspect for this clip, does not affect rendering

Type float array of 2 items in [0.1, 5000], default (0.0, 0.0)

filepath

Filename of the movie or sequence file

Type string, default ""

grease_pencil

Grease pencil data for this movie clip

Type `GreasePencil`

proxy

Type `MovieClipProxy`, (readonly)

size

Width and height in pixels, zero when image data cant be loaded

Type int array of 2 items in [-inf, inf], default (0, 0), (readonly)

source

Where the clip comes from

- `SEQUENCE` Image Sequence, Multiple image files, as a sequence.
- `MOVIE` Movie File, Movie file.

Type enum in ['SEQUENCE', 'MOVIE'], default 'SEQUENCE', (readonly)

tracking

Type `MovieTracking`, (readonly)

use_proxy

Use a preview proxy and/or timecode index for this clip

Type boolean, default False

use_proxy_custom_directory

Create proxy images in a custom directory (default is movie location)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BackgroundImage.clip`
- `BlendData.movieclips`
- `BlendDataMovieClips.load`
- `BlendDataMovieClips.remove`
- `CameraSolverConstraint.clip`
- `CompositorNodeMovieClip.clip`
- `CompositorNodeMovieDistortion.clip`
- `CompositorNodeStabilize.clip`
- `FollowTrackConstraint.clip`
- `Scene.active_clip`
- `SpaceClipEditor.clip`

2.4.360 MovieClipProxy(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieClipProxy` (*bpy_struct*)

Proxy parameters for a movie clip

build_100

Build proxy resolution 100% of the original footage dimension

Type boolean, default False

build_25

Build proxy resolution 25% of the original footage dimension

Type boolean, default False

build_50

Build proxy resolution 50% of the original footage dimension

Type boolean, default False

build_75

Build proxy resolution 75% of the original footage dimension

Type boolean, default False

build_free_run

Build free run time code index

Type boolean, default False

build_free_run_rec_date

Build free run time code index using Record Date/Time

Type boolean, default False

build_record_run

Build record run time code index

Type boolean, default False

build_undistorted

Also build undistorted proxies for selected sizes

Type boolean, default False

directory

Location to store the proxy files

Type string, default ""

quality

JPEG quality of proxy images

Type int in [0, 32767], default 0

timecode

- NONE No TC in use.
- RECORD_RUN Record Run, Use images in the order they are recorded.
- FREE_RUN Free Run, Use global timestamp written by recording device.
- FREE_RUN_REC_DATE Free Run (rec date), Interpolate a global timestamp using the record date and time written by recording device.

Type enum in ['NONE', 'RECORD_RUN', 'FREE_RUN', 'FREE_RUN_REC_DATE'], default 'NONE'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieClip.proxy`

2.4.361 MovieClipScopes(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieClipScopes` (*bpy_struct*)
Scopes for statistical view of a movie clip

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceClipEditor.scopes`

2.4.362 MovieClipUser(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieClipUser` (*bpy_struct*)

Parameters defining how a MovieClip datablock is used by another datablock

current_frame

Current frame number in movie or image sequence

Type int in [-300000, 300000], default 0, (readonly)

proxy_render_size

Draw preview using full resolution or different proxy resolutions

Type enum in ['PROXY_25', 'PROXY_50', 'PROXY_75', 'PROXY_100', 'FULL'], default 'FULL'

use_render_undistorted

Render preview using undistorted proxy

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BackgroundImage.clip_user`
- `SpaceClipEditor.clip_user`
- `UILayout.template_marker`

2.4.363 MovieReconstructedCamera(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.MovieReconstructedCamera` (*`bpy_struct`*)

Match-moving reconstructed camera data from tracker

average_error

Average error of reconstruction

Type float in [-inf, inf], default 0.0, (readonly)

frame

Frame number marker is keyframed on

Type int in [-inf, inf], default 0, (readonly)

matrix

Worldspace transformation matrix

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0), (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTrackingReconstruction.cameras`

2.4.364 MovieSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.MovieSequence` (*Sequence*)

Sequence strip to load a video

animation_offset_end

Animation end offset (trim end)

Type `int` in `[0, inf]`, default `0`

animation_offset_start

Animation start offset (trim start)

Type `int` in `[0, inf]`, default `0`

color_balance

Type `SequenceColorBalance`, (readonly)

color_multiply

Type `float` in `[0, 20]`, default `0.0`

color_saturation

Type `float` in `[0, 20]`, default `0.0`

crop

Type `SequenceCrop`, (readonly)

elements

Type `bpy_prop_collection` of `SequenceElement`, (readonly)

filepath

Type `string`, default `""`

mpeg_preseek

For MPEG movies, preseek this many frames

Type `int` in `[0, 50]`, default `0`

proxy

Type `SequenceProxy`, (readonly)

stream_index

For files with several movie streams, use the stream with the given index

Type `int` in `[0, 20]`, default `0`

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

transform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`

- `Sequence.swap`

2.4.365 MovieTracking(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieTracking` (*bpy_struct*)

Match-moving data for tracking

camera

Type `MovieTrackingCamera`, (readonly)

reconstruction

Type `MovieTrackingReconstruction`, (readonly)

settings

Type `MovieTrackingSettings`, (readonly)

stabilization

Type `MovieTrackingStabilization`, (readonly)

tracks

Collection of tracks in this tracking data object

Type `MovieTrackingTracks` `bpy_prop_collection` of `MovieTrackingTrack`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieClip.tracking`

2.4.366 MovieTrackingCamera(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieTrackingCamera` (*bpy_struct*)

Match-moving camera data for tracking

focal_length

Camera's focal length

Type float in [0.0001, 5000], default 0.0

focal_length_pixels

Camera's focal length

Type float in [0, 5000], default 0.0

k1

First coefficient of third order polynomial radial distortion

Type float in [-inf, inf], default 0.0

k2

Second coefficient of third order polynomial radial distortion

Type float in [-inf, inf], default 0.0

k3

Third coefficient of third order polynomial radial distortion

Type float in [-inf, inf], default 0.0

pixel_aspect

Pixel aspect ratio

Type float in [0.1, 5000], default 0.0

principal

Optical center of lens

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

sensor_width

Width of CCD sensor in millimeters

Type float in [0, 500], default 0.0

units

Units used for camera focal length

- `PIXELS px`, Use pixels for units of focal length.
- `MILLIMETERS mm`, Use millimeters for units of focal length.

Type enum in ['PIXELS', 'MILLIMETERS'], default 'PIXELS'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.camera`

2.4.367 `MovieTrackingMarker(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.MovieTrackingMarker` (*bpy_struct*)

Match-moving marker data for tracking

co

Marker position at frame in normalized coordinates

Type float array of 2 items in $[-inf, inf]$, default (0.0, 0.0)

enable

Is marker enabled for current frame

Type boolean, default False

frame

Frame number marker is keyframed on

Type int in $[-inf, inf]$, default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTrackingTrack.marker_find_frame`
- `MovieTrackingTrack.markers`

2.4.368 MovieTrackingReconstruction(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieTrackingReconstruction` (*bpy_struct*)

Match-moving reconstruction data from tracker

average_error

Average error of reconstruction

Type float in [-inf, inf], default 0.0, (readonly)

cameras

Collection of solved cameras

Type `bpy_prop_collection` of `MovieReconstructedCamera`, (readonly)

is_valid

Is tracking data contains valid reconstruction information

Type boolean, default False, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.reconstruction`

2.4.369 MovieTrackingSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.MovieTrackingSettings` (*bpy_struct*)

Match moving settings

clean_action

Cleanup action to execute

- `SELECT` Select, Select unclean tracks.
- `DELETE_TRACK` Delete Track, Delete unclean tracks.
- `DELETE_SEGMENTS` Delete Segments, Delete unclean segments of tracks.

Type enum in ['SELECT', 'DELETE_TRACK', 'DELETE_SEGMENTS'], default 'SELECT'

clean_error

Effect on tracks which have a larger reprojection error

Type float in [0, inf], default 0.0

clean_frames

Effect on tracks which are tracked less than the specified amount of frames

Type int in [0, inf], default 0

distance

Distance between two bundles used for scene scaling

Type float in [-inf, inf], default 0.0

frames_adjust

Automatically re-adjust marker position using position on each N frames. 0 means only keyframed position is used

Type int in [0, inf], default 0

frames_limit

Every tracking cycle, this amount of frames are tracked

Type int in [0, 32767], default 0

keyframe_a

First keyframe used for reconstruction initialization

Type int in [-inf, inf], default 0

keyframe_b

Second keyframe used for reconstruction initialization

Type int in [-inf, inf], default 0

margin

Distance from image boundary at which marker stops tracking

Type int in [0, 300], default 0

refine_intrinsics

Refine intrinsics during camera solving

- NONE Nothing, Do not refine camera intrinsics.
- FOCAL_LENGTH Focal Length, Refine focal length.
- FOCAL_LENGTH_PRINCIPAL_POINT Focal Length, Optical Center, Refine focal length and optical center.
- FOCAL_LENGTH_PRINCIPAL_POINT_RADIAL_K1_K2 Focal Length, Optical Center, K1, K2, Refine focal length, optical center and radial distortion K1 and K2.
- FOCAL_LENGTH_RADIAL_K1_K2 Focal length, K1, K2, Refine focal length and radial distortion K1 and K2.
- FOCAL_LENGTH_RADIAL_K1 Focal length, K1, Refine focal length and radial distortion K1.

Type enum in ['NONE', 'FOCAL_LENGTH', 'FOCAL_LENGTH_PRINCIPAL_POINT', 'FOCAL_LENGTH_PRINCIPAL_POINT_RADIAL_K1_K2', 'FOCAL_LENGTH_RADIAL_K1_K2', 'FOCAL_LENGTH_RADIAL_K1'], default 'NONE'

speed

Limit speed of tracking to make visual feedback easier (this does not affect the tracking quality)

- FASTEST Fastest, Track as fast as it's possible.
- DOUBLE Double, Track with double speed.
- REALTIME Realtime, Track with realtime speed.
- HALF Half, Track with half of realtime speed.
- QUARTER Quarter, Track with quarter of realtime speed.

Type enum in ['FASTEST', 'DOUBLE', 'REALTIME', 'HALF', 'QUARTER'], default 'FASTEST'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.settings`

2.4.370 `MovieTrackingStabilization(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.MovieTrackingStabilization` (*bpy_struct*)

Match-moving stabilization data for tracking

active_track_index

Index of active track in stabilization tracks list

Type `int` in `[-inf, inf]`, default `0`

influence_location

Influence of stabilization algorithm on footage location

Type `float` in `[0, 1]`, default `0.0`

influence_rotation

Influence of stabilization algorithm on footage rotation

Type `float` in `[0, 1]`, default `0.0`

influence_scale

Influence of stabilization algorithm on footage scale

Type `float` in `[0, 1]`, default `0.0`

rotation_track

Track used to compensate rotation

Type `MovieTrackingTrack`

scale_max

Limits the amount of automatic scaling

Type float in [0, 10], default 0.0

tracks

Collection of tracks used for stabilization

Type `bpy_prop_collection` of `MovieTrackingTrack`, (readonly)

use_2d_stabilization

Use 2D stabilization for footage

Type boolean, default False

use_autoscale

Automatically scale footage to cover unfilled areas when stabilizing

Type boolean, default False

use_stabilize_rotation

Stabilize horizon line on the shot

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.stabilization`

2.4.371 `MovieTrackingTrack(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.MovieTrackingTrack` (*bpy_struct*)
Match-moving track data for tracking

average_error

Average error of re-projection

Type float in [-inf, inf], default 0.0, (readonly)

bundle

Position of bundle reconstructed from this track

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0), (readonly)

color

Color of the track in the Movie Track Editor and the 3D viewport after a solve

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

correlation_min

Minimal value of correlation between mathed pattern and reference which is still treated as successful tracking

Type float in [-1, 1], default 0.0

has_bundle

True if track has a valid bundle

Type boolean, default False, (readonly)

hide

Track is hidden

Type boolean, default False

lock

Track is locked and all changes to it are disabled

Type boolean, default False

markers

Collection of markers in track

Type `bpy_prop_collection` of `MovieTrackingMarker`, (readonly)

name

Unique name of track

Type string, default ""

pattern_max

Right-bottom corner of pattern area in normalized coordinates relative to marker position

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

pattern_min

Left-bottom corner of pattern area in normalized coordinates relative to marker position

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

pyramid_levels

Number of pyramid levels (increase on blurry footage)

Type int in [1, 16], default 0

search_max

Right-bottom corner of search area in normalized coordinates relative to marker position

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

search_min

Left-bottom corner of search area in normalized coordinates relative to marker position

Type float array of 2 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0)

select

Track is selected

Type boolean, default False

select_anchor

Track's anchor point is selected

Type boolean, default False

select_pattern

Track's pattern area is selected

Type boolean, default False

select_search

Track's search area is selected

Type boolean, default False

t_tracker

Tracking algorithm to use

- KLT KLT, Kanade–Lucas–Tomasi tracker which works with most of video clips, a bit slower than SAD.
- SAD SAD, Sum of Absolute Differences tracker which can be used when MLT tracker fails.

Type enum in ['KLT', 'SAD'], default 'KLT'

use_blue_channel

Use blue channel from footage for tracking

Type boolean, default False

use_custom_color

Use custom color instead of theme-defined

Type boolean, default False

use_green_channel

Use green channel from footage for tracking

Type boolean, default False

use_red_channel

Use red channel from footage for tracking

Type boolean, default False

marker_find_frame (*frame*)

Get marker for specified frame

Parameters **frame** (*int in [0, 300000]*) – Frame, type for the new spline

Returns Marker for specified frame

Return type `MovieTrackingMarker`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.tracks`
- `MovieTrackingStabilization.rotation_track`
- `MovieTrackingStabilization.tracks`
- `MovieTrackingTracks.active`
- `UILayout.template_marker`

2.4.372 `MovieTrackingTracks(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.MovieTrackingTracks` (*bpy_struct*)

Collection of movie tracking tracks

active

Active track in this tracking data object

Type `MovieTrackingTrack`

add (*frame=1, count=1*)

Add a number of tracks to this movie clip

Parameters

- **frame** (*int in [0, 300000], (optional)*) – Frame, Frame number to add tracks on
- **count** (*int in [0, inf], (optional)*) – Number, Number of tracks to add to the movie clip

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MovieTracking.tracks`

2.4.373 MulticamSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.MulticamSequence` (*Sequence*)

Sequence strip to perform multicam editing: select channel from below

animation_offset_end

Animation end offset (trim end)

Type `int` in `[0, inf]`, default `0`

animation_offset_start

Animation start offset (trim start)

Type `int` in `[0, inf]`, default `0`

color_balance

Type `SequenceColorBalance`, (readonly)

color_multiply

Type `float` in `[0, 20]`, default `0.0`

color_saturation

Type `float` in `[0, 20]`, default `0.0`

crop

Type `SequenceCrop`, (readonly)

multicam_source

Type int in [0, 31], default 0

proxy

Type `SequenceProxy`, (readonly)

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

transform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False**use_translation**

Translate image before processing

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.374 MultiresModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.MultiresModifier` (*Modifier*)

Multiresolution mesh modifier

filepath

Path to external displacements file

Type string, default ""

is_external

Store multires displacements outside the .blend file, to save memory

Type boolean, default False, (readonly)

levels

Number of subdivisions to use in the viewport

Type int in [0, 255], default 0

render_levels

The subdivision level visible at render time

Type int in [0, 255], default 0

sculpt_levels

Number of subdivisions to use in sculpt mode

Type int in [0, 255], default 0

show_only_control_edges

Skip drawing/rendering of interior subdivided edges

Type boolean, default False

subdivision_type

Selects type of subdivision algorithm

Type enum in ['CATMULL_CLARK', 'SIMPLE'], default 'CATMULL_CLARK'

total_levels

Number of subdivisions for which displacements are stored

Type int in [0, 255], default 0, (readonly)

use_subsurf_uv

Use subsurf to subdivide UVs

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.375 MusgraveTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.MusgraveTexture` (*Texture*)

Procedural musgrave texture

dimension_max

Highest fractal dimension

Type float in [0.0001, 2], default 0.0

gain

The gain multiplier

Type float in [0, 6], default 0.0

lacunarity

Gap between successive frequencies

Type float in [0, 6], default 0.0

musgrave_type

- **MULTIFRACTAL** Multifractal, Fractal noise algorithm. Multifractal: Uses Perlin noise as a basis.

- RIDGED_MULTIFRACTAL** Ridged Multifractal, Fractal noise algorithm. Ridged Multifractal: Uses Perlin noise with inflection as a basis.
- HYBRID_MULTIFRACTAL** Hybrid Multifractal, Fractal noise algorithm. Hybrid Multifractal: Uses Perlin noise as a basis, with extended controls.
- FBM** fBM, Fractal noise algorithm. Fractal Brownian Motion: Uses Brownian noise as a basis.
- HETERO_TERRAIN** Hetero Terrain, Fractal noise algorithm. Hetero Terrain: similar to multifractal.

Type enum in ['MULTIFRACTAL', 'RIDGED_MULTIFRACTAL', 'HYBRID_MULTIFRACTAL', 'FBM', 'HETERO_TERRAIN'], default 'MULTIFRACTAL'

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_basis

Sets the noise basis used for turbulence

- BLENDER_ORIGINAL** Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- ORIGINAL_PERLIN** Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- IMPROVED_PERLIN** Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- VORONOI_F1** Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- VORONOI_F2** Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- VORONOI_F3** Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- VORONOI_F4** Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- VORONOI_F2_F1** Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- VORONOI_CRACKLE** Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- CELL_NOISE** Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_intensity

Scales the intensity of the noise

Type float in [0, 10], default 0.0

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

octaves

Number of frequencies used

Type float in [0, 8], default 0.0

offset

The fractal offset

Type float in [0, 6], default 0.0

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.376 NandController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.NandController` (*Controller*)
Controller passing on events based on a logical NAND operation

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.377 NearSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.NearSensor` (*Sensor*)

Sensor to detect nearby objects

distance

Trigger distance

Type float in [0, 10000], default 0.0

property

Only look for objects with this property (blank = all objects)

Type string, default ""

reset_distance

The distance where the sensor forgets the actor

Type float in [0, 10000], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.378 NlaStrip(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NlaStrip` (*bpy_struct*)

A container referencing an existing Action

action

Action referenced by this strip

Type `Action`

action_frame_end

Type float in [-inf, inf], default 0.0

action_frame_start

Type float in [-inf, inf], default 0.0

active

NLA Strip is active

Type boolean, default False, (readonly)

blend_in

Number of frames at start of strip to fade in influence

Type float in [-inf, inf], default 0.0

blend_out

Type float in [-inf, inf], default 0.0

blend_type

Method used for combining strip's result with accumulated result

- REPLACE Replace, Result strip replaces the accumulated results by amount specified by influence.
- ADD Add, Weighted result of strip is added to the accumulated results.
- SUBTRACT Subtract, Weighted result of strip is removed from the accumulated results.
- MULITPLY Multiply, Weighted result of strip is multiplied with the accumulated results.

Type enum in ['REPLACE', 'ADD', 'SUBTRACT', 'MULITPLY'], default 'REPLACE'

extrapolation

Action to take for gaps past the strip extents

- NOTHING Nothing, Strip has no influence past its extents.
- HOLD Hold, Hold the first frame if no previous strips in track, and always hold last frame.
- HOLD_FORWARD Hold Forward, Only hold last frame.

Type enum in ['NOTHING', 'HOLD', 'HOLD_FORWARD'], default 'HOLD'

fcurves

F-Curves for controlling the strip's influence and timing

Type `bpy_prop_collection` of `FCurve`, (readonly)

frame_end

Type float in [-inf, inf], default 0.0

frame_start

Type float in [-inf, inf], default 0.0

influence

Amount the strip contributes to the current result

Type float in [0, 1], default 0.0

modifiers

Modifiers affecting all the F-Curves in the referenced Action

Type `bpy_prop_collection` of `FModifier`, (readonly)

mute

NLA Strip is not evaluated

Type boolean, default False

name

Type string, default ""

repeat

Number of times to repeat the action range

Type float in [0.1, 1000], default 0.0

scale

Scaling factor for action

Type float in [0.0001, 1000], default 0.0

select

NLA Strip is selected

Type boolean, default False

strip_time

Frame of referenced Action to evaluate

Type float in [-inf, inf], default 0.0

strips

NLA Strips that this strip acts as a container for (if it is of type Meta)

Type `bpy_prop_collection` of `NlaStrip`, (readonly)

type

Type of NLA Strip

- CLIP Action Clip, NLA Strip references some Action.
- TRANSITION Transition, NLA Strip 'transitions' between adjacent strips.
- META Meta, NLA Strip acts as a container for adjacent strips.
- SOUND Sound Clip, NLA Strip representing a sound event for speakers.

Type enum in ['CLIP', 'TRANSITION', 'META', 'SOUND'], default 'CLIP', (readonly)

use_animated_influence

Influence setting is controlled by an F-Curve rather than automatically determined

Type boolean, default False

use_animated_time

Strip time is controlled by an F-Curve rather than automatically determined

Type boolean, default False

use_animated_time_cyclic

Cycle the animated time within the action start & end

Type boolean, default False

use_auto_blend

Number of frames for Blending In/Out is automatically determined from overlapping strips

Type boolean, default False

use_reverse

NLA Strip is played back in reverse order (only when timing is automatically determined)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NlaStrip.strips`
- `NlaStrips.new`
- `NlaStrips.remove`
- `NlaTrack.strips`

2.4.379 NlaStrips(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NlaStrips` (*bpy_struct*)
Collection of Nla Strips

new (*name, start, action*)
Add a new Action-Clip strip to the track

Parameters

- **name** (*string*) – Name for the NLA Strips
- **start** (*int in [-inf, inf]*) – Start Frame, Start frame for this strip
- **action** (*Action, (never None)*) – Action to assign to this strip

Returns New NLA Strip

Return type `NlaStrip`

remove (*strip*)
Remove a NLA Strip

Parameters **strip** (`NlaStrip, (never None)`) – NLA Strip to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NlaTrack.strips`

2.4.380 NlaTrack(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NlaTrack` (*bpy_struct*)

A animation layer containing Actions referenced as NLA strips

active

NLA Track is active

Type boolean, default False, (readonly)

is_solo

NLA Track is evaluated itself (i.e. active Action and all other NLA Tracks in the same AnimData block are disabled)

Type boolean, default False, (readonly)

lock

NLA Track is locked

Type boolean, default False

mute

NLA Track is not evaluated

Type boolean, default False

name

Type string, default ""

select

NLA Track is selected

Type boolean, default False

strips

NLA Strips on this NLA-track

Type `NlaStrips` `bpy_prop_collection` of `NlaStrip`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `AnimData.nla_tracks`
- `NlaTracks.active`
- `NlaTracks.new`
- `NlaTracks.new`
- `NlaTracks.remove`

2.4.381 NlaTracks(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NlaTracks` (*bpy_struct*)
Collection of NLA Tracks

active

Active Object constraint

Type `NlaTrack`

new (*prev=None*)

Add a new NLA Track

Parameters `prev` (`NlaTrack`, (optional)) – NLA Track to add the new one after

Returns New NLA Track

Return type `NlaTrack`

remove (*track*)

Remove a NLA Track

Parameters `track` (`NlaTrack`, (never None)) – NLA Track to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AnimData.nla_tracks`

2.4.382 Node(`bpy_struct`)

base class — `bpy_struct`

subclasses — `NodeFrame`, `NodeWhileLoop`, `TextureNode`, `ShaderNode`, `CompositorNode`, `NodeForLoop`, `NodeGroup`

class `bpy.types.Node` (*`bpy_struct`*)

Node in a node tree

inputs

Type `bpy_prop_collection` of `NodeSocket`, (readonly)

label

Optional custom node label

Type string, default ""

location

Type float array of 2 items in [-10000, 10000], default (0.0, 0.0)

name

Unique node identifier

Type string, default ""

outputs

Type `bpy_prop_collection` of `NodeSocket`, (readonly)

parent

Parent this node is attached to

Type `Node`, (readonly)

show_texture

Draw node in viewport textured draw mode

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `CompositorNodeTree.nodes`
- `CompositorNodes.new`
- `CompositorNodes.remove`
- `Node.parent`
- `NodeLink.from_node`
- `NodeLink.to_node`
- `ShaderNodeTree.nodes`
- `ShaderNodes.new`
- `ShaderNodes.remove`
- `TextureNodeTree.nodes`
- `TextureNodes.new`
- `TextureNodes.remove`
- `UILayout.template_node_link`
- `UILayout.template_node_view`

2.4.383 NodeForLoop(Node)

base classes — `bpy_struct`, `Node`

class `bpy.types.NodeForLoop` (*Node*)

node_tree

Type `NodeTree`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.384 NodeFrame(Node)

base classes — `bpy_struct`, `Node`

class `bpy.types.NodeFrame` (*Node*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.385 NodeGroup(Node)

base classes — `bpy_struct`, `Node`

class `bpy.types.NodeGroup` (*Node*)

node_tree

Type `NodeTree`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.386 NodeLink(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NodeLink` (*bpy_struct*)

Link between nodes in a node tree

from_node

Type `Node`, (readonly)

from_socket

Type `NodeSocket`, (readonly)

to_node

Type `Node`, (readonly)

to_socket

Type `NodeSocket`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NodeLinks.new`
- `NodeLinks.remove`
- `NodeTree.links`

2.4.387 NodeLinks(bpy_struct)

base class — `bpy_struct`

class `bpy.types.NodeLinks` (*bpy_struct*)
Collection of Node Links

new (*input*, *output*)
Add a node link to this node tree

Parameters

- **input** (`NodeSocket`) – The input socket
- **output** (`NodeSocket`) – The output socket

Returns New node link

Return type `NodeLink`

remove (*link*)

remove a node link from the node tree

Parameters **link** (`NodeLink`) – The node link to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `NodeTree.links`

2.4.388 NodeSocket(bpy_struct)

base class — `bpy_struct`

subclasses — `NodeSocketVectorAcceleration`, `NodeSocketVectorTranslation`,
`NodeSocketFloatPercentage`, `NodeSocketFloatAngle`, `NodeSocketIntUnsigned`,
`NodeSocketVectorEuler`, `NodeSocketFloatNone`, `NodeSocketFloatTime`,
`NodeSocketIntNone`, `NodeSocketFloatFactor`, `NodeSocketVectorXYZ`, `NodeSocketShader`,
`NodeSocketFloatDistance`, `NodeSocketFloatUnsigned`, `NodeSocketVectorNone`,
`NodeSocketRGBA`, `NodeSocketBoolean`, `NodeSocketVectorDirection`,
`NodeSocketVectorVelocity`

class `bpy.types.NodeSocket` (*bpy_struct*)

Input or output socket of a node

group_socket

For group nodes, the group input or output socket this corresponds to

Type `NodeSocket`, (readonly)

name

Socket name

Type `string`, default `""`

show_expanded

Socket links are expanded in the user interface

Type `boolean`, default `False`

type

Node Socket type

Type `enum` in [`'VALUE'`, `'VECTOR'`, `'RGBA'`], default `'VALUE'`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `GroupInputs.expose`
- `GroupInputs.expose`
- `GroupInputs.new`
- `GroupOutputs.expose`
- `GroupOutputs.expose`
- `GroupOutputs.new`
- `Node.inputs`
- `Node.outputs`
- `NodeLink.from_socket`
- `NodeLink.to_socket`

- `NodeLinks.new`
- `NodeLinks.new`
- `NodeSocket.group_socket`
- `NodeTree.inputs`
- `NodeTree.outputs`
- `UILayout.template_node_link`
- `UILayout.template_node_view`

2.4.389 NodeSocketBoolean(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketBoolean` (*NodeSocket*)

Input or output socket of a node

default_value

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.390 NodeSocketFloatAngle(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatAngle` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [-inf, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.391 NodeSocketFloatDistance(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatDistance` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [-inf, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.392 NodeSocketFloatFactor(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatFactor` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [0, 1], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.393 NodeSocketFloatNone(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatNone` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [-inf, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`

- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.394 NodeSocketFloatPercentage(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatPercentage` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [-inf, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.395 NodeSocketFloatTime(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatTime` (*NodeSocket*)
Input or output socket of a node

default_value

Type float in [-inf, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.396 NodeSocketFloatUnsigned(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketFloatUnsigned` (*NodeSocket*)

Input or output socket of a node

default_value

Type float in [0, inf], default 0.0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.397 NodeSocketIntNone(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketIntNone` (*NodeSocket*)

Input or output socket of a node

default_value

Type `int` in `[-inf, inf]`, default `0`

subtype

Subtype defining the socket value details

Type `enum` in `['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ']`, default `'INT_NONE'`

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.398 NodeSocketIntUnsigned(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketIntUnsigned` (*NodeSocket*)

Input or output socket of a node

default_value

Type int in [0, inf], default 0

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.399 NodeSocketRGBA(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketRGBA` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`

- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.400 NodeSocketShader(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketShader` (*NodeSocket*)
Input or output socket of a node

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.401 NodeSocketVectorAcceleration(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorAcceleration` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

subtype

Subtype defining the socket value details

Type enum in `['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ']`, default `'INT_NONE'`

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.402 NodeSocketVectorDirection(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorDirection` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

subtype

Subtype defining the socket value details

Type enum in `['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ']`, default `'INT_NONE'`

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.403 NodeSocketVectorEuler(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorEuler` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.404 NodeSocketVectorNone(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorNone` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME',

'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.405 NodeSocketVectorTranslation(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorTranslation` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

subtype

Subtype defining the socket value details

Type enum in `['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ']`, default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.406 NodeSocketVectorVelocity(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorVelocity` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

subtype

Subtype defining the socket value details

Type enum in `['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ']`, default `'INT_NONE'`

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`

- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.407 NodeSocketVectorXYZ(NodeSocket)

base classes — `bpy_struct`, `NodeSocket`

class `bpy.types.NodeSocketVectorXYZ` (*NodeSocket*)

Input or output socket of a node

default_value

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

subtype

Subtype defining the socket value details

Type enum in ['INT_NONE', 'INT_UNSIGNED', 'FLOAT_NONE', 'FLOAT_UNSIGNED', 'FLOAT_PERCENTAGE', 'FLOAT_FACTOR', 'FLOAT_ANGLE', 'FLOAT_TIME', 'FLOAT_DISTANCE', 'VECTOR_NONE', 'VECTOR_TRANSLATION', 'VECTOR_DIRECTION', 'VECTOR_VELOCITY', 'VECTOR_ACCELERATION', 'VECTOR_EULER', 'VECTOR_XYZ'], default 'INT_NONE'

Inherited Properties

- `bpy_struct.id_data`
- `NodeSocket.name`
- `NodeSocket.show_expanded`
- `NodeSocket.group_socket`
- `NodeSocket.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.408 NodeTree(ID)

base classes — `bpy_struct`, `ID`

subclasses — `CompositorNodeTree`, `ShaderNodeTree`, `TextureNodeTree`

class `bpy.types.NodeTree` (*ID*)

Node tree consisting of linked nodes used for materials, textures and compositing

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

grease_pencil

Grease Pencil datablock

Type `GreasePencil`

inputs

Type `GroupInputs` `bpy_prop_collection` of `NodeSocket`, (readonly)

links

Type `NodeLinks` `bpy_prop_collection` of `NodeLink`, (readonly)

outputs

Type `GroupOutputs` `bpy_prop_collection` of `NodeSocket`, (readonly)

type

Node Tree type

- `SHADER` Shader, Shader nodes.
- `TEXTURE` Texture, Texture nodes.
- `COMPOSITING` Compositing, Compositing nodes.

Type enum in [`'SHADER'`, `'TEXTURE'`, `'COMPOSITING'`], default `'SHADER'`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.node_groups`
- `BlendDataNodeTrees.new`
- `BlendDataNodeTrees.remove`
- `CompositorNodes.new`
- `Lamp.node_tree`
- `Material.node_tree`
- `NodeForLoop.node_tree`
- `NodeGroup.node_tree`
- `NodeWhileLoop.node_tree`
- `Scene.node_tree`
- `ShaderNodes.new`
- `SpaceNodeEditor.node_tree`
- `Texture.node_tree`
- `TextureNodes.new`
- `UILayout.template_node_link`
- `UILayout.template_node_view`
- `World.node_tree`

2.4.409 NodeWhileLoop(Node)

base classes — `bpy_struct`, `Node`

class `bpy.types.NodeWhileLoop` (*Node*)

max_iterations

Limit for number of iterations

Type `int` in `[0, 32767]`, default `0`

node_tree

Type `NodeTree`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.410 NoiseTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.NoiseTexture` (*Texture*)

Procedural noise texture

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`

- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.411 NorController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.NorController` (*Controller*)
Controller passing on events based on a logical NOR operation

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.412 Object(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Object` (*ID*)
Object datablock defining an object in a scene

active_material
Active material being displayed

Type `Material`

active_material_index

Index of active material slot

Type int in [0, inf], default 0**active_shape_key**

Current shape key

Type ShapeKey, (readonly)**active_shape_key_index**

Current shape key index

Type int in [-32768, 32767], default 0**animation_data**

Animation data for this datablock

Type AnimData, (readonly)**animation_visualisation**

Animation data for this datablock

Type AnimViz, (readonly, never None)**bound_box**

Object's bounding box in object-space coordinates, all values are -1.0 when not available

Type float array of 24 items in [-inf, inf], default (0.0, 0.0), (readonly)**collision**

Settings for using the object as a collider in physics simulation

Type CollisionSettings, (readonly)**color**

Object color and alpha, used when faces have the ObColor mode enabled

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)**constraints**

Constraints affecting the transformation of the object

Type ObjectConstraints bpy_prop_collection of Constraint, (readonly)**data**

Object data

Type ID**delta_location**

Extra translation added to the location of the object

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**delta_rotation_euler**

Extra rotation added to the rotation of the object (when using Euler rotations)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**delta_rotation_quaternion**

Extra rotation added to the rotation of the object (when using Quaternion rotations)

Type float array of 4 items in [-inf, inf], default (1.0, 0.0, 0.0, 0.0)

delta_scale

Extra scaling added to the scale of the object

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

dimensions

Absolute bounding box dimensions of the object

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

draw_bounds_type

Object boundary display type

- BOX Box, Draw bounds as box.
- SPHERE Sphere, Draw bounds as sphere.
- CYLINDER Cylinder, Draw bounds as cylinder.
- CONE Cone, Draw bounds as cone.

Type enum in ['BOX', 'SPHERE', 'CYLINDER', 'CONE'], default 'BOX'

draw_type

Maximum draw type to display object with in viewport

- BOUNDS Bounds, Draw the bounding box of the object.
- WIRE Wire, Draw the object as a wireframe.
- SOLID Solid, Draw the object as a solid (if solid drawing is enabled in the viewport).
- TEXTURED Textured, Draw the object with textures (if textures are enabled in the viewport).

Type enum in ['BOUNDS', 'WIRE', 'SOLID', 'TEXTURED'], default 'BOUNDS'

dupli_faces_scale

Scale the DupliFace objects

Type float in [0.001, 10000], default 0.0

dupli_frames_end

End frame for DupliFrames

Type int in [-300000, 300000], default 0

dupli_frames_off

Recurring frames to exclude from the Dupliframes

Type int in [0, 300000], default 0

dupli_frames_on

Number of frames to use between DupOff frames

Type int in [0, 300000], default 0

dupli_frames_start

Start frame for DupliFrames

Type int in [-300000, 300000], default 0

dupli_group

Instance an existing group

Type [Group](#)

dupli_list

Object duplis

Type `bpy_prop_collection` of `DupliObject`, (readonly)**dupli_type**

If not None, object duplication method to use

- NONE None.
- FRAMES Frames, Make copy of object for every frame.
- VERTS Verts, Duplicate child objects on all vertices.
- FACES Faces, Duplicate child objects on all faces.
- GROUP Group, Enable group instancing.

Type enum in ['NONE', 'FRAMES', 'VERTS', 'FACES', 'GROUP'], default 'NONE'**empty_draw_size**

Size of display for empties in the viewport

Type float in [0.0001, 1000], default 0.0**empty_draw_type**

Viewport display style for empties

Type enum in ['PLAIN_AXES', 'ARROWS', 'SINGLE_ARROW', 'CIRCLE', 'CUBE', 'SPHERE', 'CONE', 'IMAGE'], default 'PLAIN_AXES'**empty_image_offset**

Origin offset distance

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)**field**

Settings for using the object as a field in physics simulation

Type `FieldSettings`, (readonly)**game**

Game engine related settings for the object

Type `GameObjectSettings`, (readonly, never None)**grease_pencil**

Grease Pencil datablock

Type `GreasePencil`**hide**

Restrict visibility in the viewport

Type boolean, default False**hide_render**

Restrict renderability

Type boolean, default False**hide_select**

Restrict selection in the viewport

Type boolean, default False

is_duplicator

Type boolean, default False, (readonly)

layers

Layers the object is on

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

location

Location of the object

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

lock_location

Lock editing of location in the interface

Type boolean array of 3 items, default (False, False, False)

lock_rotation

Lock editing of rotation in the interface

Type boolean array of 3 items, default (False, False, False)

lock_rotation_w

Lock editing of 'angle' component of four-component rotations in the interface

Type boolean, default False

lock_rotations_4d

Lock editing of four component rotations by components (instead of as Eulers)

Type boolean, default False

lock_scale

Lock editing of scale in the interface

Type boolean array of 3 items, default (False, False, False)

material_slots

Material slots in the object

Type `bpy_prop_collection` of `MaterialSlot`, (readonly)

matrix_basis

Matrix access to location, rotation and scale (including deltas), before constraints and parenting are applied

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_local

Parent relative transformation matrix

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_parent_inverse

Inverse of object's parent matrix at time of parenting

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_world

Worldspace transformation matrix

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

mode

Object interaction mode

Type enum in ['OBJECT', 'EDIT', 'SCULPT', 'VERTEX_PAINT', 'WEIGHT_PAINT', 'TEXTURE_PAINT', 'PARTICLE_EDIT', 'POSE'], default 'OBJECT', (readonly)

modifiers

Modifiers affecting the geometric data of the object

Type `ObjectModifiers bpy_prop_collection` of `Modifier`, (readonly)

motion_path

Motion Path for this element

Type `MotionPath`, (readonly)

parent

Parent Object

Type `Object`

parent_bone

Name of parent bone in case of a bone parenting relation

Type string, default ""

parent_type

Type of parent relation

- OBJECT Object, The object is parented to an object.
- CURVE Curve, The object is parented to a curve.
- KEY Key.
- ARMATURE Armature.
- LATTICE Lattice, The object is parented to a lattice.
- VERTEX Vertex, The object is parented to a vertex.
- VERTEX_3 3 Vertices.
- BONE Bone, The object is parented to a bone.

Type enum in ['OBJECT', 'CURVE', 'KEY', 'ARMATURE', 'LATTICE', 'VERTEX', 'VERTEX_3', 'BONE'], default 'OBJECT'

parent_vertices

Indices of vertices in case of a vertex parenting relation

Type int array of 3 items in [0, inf], default (0, 0, 0)

particle_systems

Particle systems emitted from the object

Type `ParticleSystems bpy_prop_collection` of `ParticleSystem`, (readonly)

pass_index

Index # for the IndexOB render pass

Type int in [0, 32767], default 0

pose

Current pose for armatures

Type `Pose`, (readonly)

pose_library

Action used as a pose library for armatures

Type `Action`

proxy

Library object this proxy object controls

Type `Object`, (readonly)

proxy_group

Library group duplicator object this proxy object controls

Type `Object`, (readonly)

rotation_axis_angle

Angle of Rotation for Axis-Angle rotation representation

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 1.0, 0.0)

rotation_euler

Rotation in Eulers

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

rotation_mode

- `QUATERNION` Quaternion (WXYZ), No Gimbal Lock.
- `XYZ` XYZ Euler, XYZ Rotation Order - prone to Gimbal Lock (default).
- `XZY` XZY Euler, XZY Rotation Order - prone to Gimbal Lock.
- `YXZ` YXZ Euler, YXZ Rotation Order - prone to Gimbal Lock.
- `YZX` YZX Euler, YZX Rotation Order - prone to Gimbal Lock.
- `ZXY` ZXY Euler, ZXY Rotation Order - prone to Gimbal Lock.
- `ZYX` ZYX Euler, ZYX Rotation Order - prone to Gimbal Lock.
- `AXIS_ANGLE` Axis Angle, Axis Angle (W+XYZ), defines a rotation around some axis defined by 3D-Vector.

Type enum in ['QUATERNION', 'XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX', 'AXIS_ANGLE'], default 'QUATERNION'

rotation_quaternion

Rotation in Quaternions

Type float array of 4 items in [-inf, inf], default (1.0, 0.0, 0.0, 0.0)

scale

Scaling of the object

Type float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)

select

Object selection state

Type boolean, default False

show_axis

Display the object's origin and axes

Type boolean, default False

show_bounds

Display the object's bounds

Type boolean, default False

show_name

Display the object's name

Type boolean, default False

show_only_shape_key

Always show the current Shape for this Object

Type boolean, default False

show_texture_space

Display the object's texture space

Type boolean, default False

show_transparent

Display material transparency in the object (unsupported for duplicator drawing)

Type boolean, default False

show_wire

Add the object's wireframe over solid drawing

Type boolean, default False

show_x_ray

Make the object draw in front of others (unsupported for duplicator drawing)

Type boolean, default False

slow_parent_offset

Amount of delay in the parent relationship

Type float in [-300000, 300000], default 0.0

soft_body

Settings for soft body simulation

Type `SoftBodySettings`, (readonly)

track_axis

Axis that points in 'forward' direction (applies to DupliFrame when parent 'Follow' is enabled)

Type enum in ['POS_X', 'POS_Y', 'POS_Z', 'NEG_X', 'NEG_Y', 'NEG_Z'], default 'POS_X'

type

Type of Object

Type enum in ['MESH', 'CURVE', 'SURFACE', 'META', 'FONT', 'ARMATURE', 'LATTICE', 'EMPTY', 'CAMERA', 'LAMP', 'SPEAKER'], default 'EMPTY', (readonly)

up_axis

Axis that points in the upward direction (applies to DupliFrame when parent 'Follow' is enabled)

Type enum in ['X', 'Y', 'Z'], default 'X'

use_dupli_faces_scale

Scale dupli based on face size

Type boolean, default False

use_dupli_frames_speed

Set dupliframes to use the current frame instead of parent curve's evaluation time

Type boolean, default False

use_dupli_vertices_rotation

Rotate dupli according to vertex normal

Type boolean, default False

use_shape_key_edit_mode

Apply shape keys in edit mode (for Meshes only)

Type boolean, default False

use_slow_parent

Create a delay in the parent relationship (Beware: this isn't renderfarm safe and may be invalid after jumping around the timeline)

Type boolean, default False

vertex_groups

Vertex groups of the object

Type [VertexGroups](#) [bpy_prop_collection](#) of [VertexGroup](#), (readonly)

children

All the children of this object (readonly)

users_group

The groups this object is in (readonly)

users_scene

The scenes this object is in (readonly)

to_mesh (*scene, apply_modifiers, settings*)

Create a Mesh datablock with modifiers applied

Parameters

- **scene** ([Scene](#), (never None)) – Scene within which to evaluate modifiers
- **apply_modifiers** (*boolean*) – Apply modifiers
- **settings** (*enum in ['PREVIEW', 'RENDER']*) – Modifier settings to apply
 - PREVIEW Preview, Apply modifier preview settings.
 - RENDER Render, Apply modifier render settings.

Returns Mesh created from object, remove it if it is only used for export

Return type [Mesh](#)

dupli_list_create (*scene*)

Create a list of dupli objects for this object, needs to be freed manually with `free_dupli_list` to restore the objects real matrix and layers

Parameters **scene** ([Scene](#), (never None)) – Scene within which to evaluate duplis

dupli_list_clear ()

Free the list of dupli objects

find_armature ()

Find armature influencing this object as a parent or via a modifier

Returns Armature object influencing this object or NULL

Return type `Object`

shape_key_add (*name="Key", from_mix=True*)

Add shape key to an object

Parameters

- **name** (*string, (optional)*) – Unique name for the new keylock
- **from_mix** (*boolean, (optional)*) – Create new shape from existing mix of shapes

Returns New shape keyblock

Return type `ShapeKey`

ray_cast (*start, end*)

Cast a ray onto in object space

Return (location, normal, index) *location*, The hit location of this ray cast, float array of 3 items in [-inf, inf]

normal, The face normal at the ray cast hit location, float array of 3 items in [-inf, inf]

index, The face index, -1 when no intersection is found, int in [-inf, inf]

closest_point_on_mesh (*point, max_dist=1.84467e+19*)

Find the nearest point on the object

Return (location, normal, index) *location*, The location on the object closest to the point, float array of 3 items in [-inf, inf]

normal, The face normal at the closest point, float array of 3 items in [-inf, inf]

index, The face index, -1 when no closest point is found, int in [-inf, inf]

is_visible (*scene*)

Determine if object is visible in a given scene

Returns Object visibility

Return type `boolean`

is_modified (*scene, settings*)

Determine if this object is modified from the base mesh data

Parameters **settings** (*enum in ['PREVIEW', 'RENDER']*) – Modifier settings to apply

- `PREVIEW` Preview, Apply modifier preview settings.
- `RENDER` Render, Apply modifier render settings.

Returns Object visibility

Return type `boolean`

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`

- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `ActionConstraint.target`
- `ArmatureActuator.secondary_target`
- `ArmatureActuator.target`
- `ArmatureModifier.object`
- `ArrayModifier.curve`
- `ArrayModifier.end_cap`
- `ArrayModifier.offset_object`
- `ArrayModifier.start_cap`
- `BlendData.objects`
- `BlendDataObjects.new`
- `BlendDataObjects.remove`
- `BoidRuleAvoid.object`
- `BoidRuleFollowLeader.object`
- `BoidRuleGoal.object`
- `BooleanModifier.object`
- `Camera.dof_object`
- `CameraActuator.object`
- `CastModifier.object`
- `ChildOfConstraint.target`
- `ClampToConstraint.target`

- `ConstraintTarget.target`
- `CopyLocationConstraint.target`
- `CopyRotationConstraint.target`
- `CopyScaleConstraint.target`
- `CopyTransformsConstraint.target`
- `Curve.bevel_object`
- `Curve.taper_object`
- `CurveModifier.object`
- `CurveSplines.active`
- `DampedTrackConstraint.target`
- `DisplaceModifier.texture_coords_object`
- `DupliObject.object`
- `DynamicPaintSurface.output_exists`
- `EditObjectActuator.object`
- `EditObjectActuator.track_object`
- `EnvironmentMap.viewpoint_object`
- `FloorConstraint.target`
- `FollowPathConstraint.target`
- `Group.objects`
- `GroupObjects.link`
- `GroupObjects.unlink`
- `HookModifier.object`
- `KinematicConstraint.pole_target`
- `KinematicConstraint.target`
- `LampTextureSlot.object`
- `LatticeModifier.object`
- `LimitDistanceConstraint.target`
- `LockedTrackConstraint.target`
- `MaskModifier.armature`
- `MaterialTextureSlot.object`
- `MeshDeformModifier.object`
- `MirrorModifier.mirror_object`
- `Object.find_armature`
- `Object.parent`
- `Object.proxy`
- `Object.proxy_group`
- `ObjectActuator.reference_object`
- `ObjectBase.object`
- `OceanTexData.ocean_object`
- `ParentActuator.object`
- `ParticleEdit.object`
- `ParticleInstanceModifier.object`
- `ParticleSettings.billboard_object`
- `ParticleSettings.dupli_object`
- `ParticleSettingsTextureSlot.object`
- `ParticleSystem.parent`
- `ParticleSystem.reactor_target_object`
- `ParticleTarget.object`
- `PivotConstraint.target`
- `PointDensity.object`
- `PoseBone.custom_shape`
- `PropertyActuator.object`
- `RigidBodyJointConstraint.child`
- `RigidBodyJointConstraint.target`

- `Scene.camera`
- `Scene.objects`
- `SceneActuator.camera`
- `SceneObjects.active`
- `SceneObjects.link`
- `SceneObjects.unlink`
- `SceneSequence.scene_camera`
- `ScrewModifier.object`
- `ShrinkwrapConstraint.target`
- `ShrinkwrapModifier.auxiliary_target`
- `ShrinkwrapModifier.target`
- `SimpleDeformModifier.origin`
- `SpaceView3D.camera`
- `SpaceView3D.lock_object`
- `SplineIKConstraint.target`
- `SteeringActuator.navmesh`
- `SteeringActuator.target`
- `StretchToConstraint.target`
- `TextCurve.follow_curve`
- `TimelineMarker.camera`
- `ToolSettings.etch_template`
- `TrackToConstraint.target`
- `TransformConstraint.target`
- `UVProjector.object`
- `VertexWeightEditModifier.mask_tex_map_object`
- `VertexWeightMixModifier.mask_tex_map_object`
- `VertexWeightProximityModifier.mask_tex_map_object`
- `VertexWeightProximityModifier.target`
- `VoxelData.domain_object`
- `WarpModifier.object_from`
- `WarpModifier.object_to`
- `WarpModifier.texture_coords_object`
- `WaveModifier.start_position_object`
- `WaveModifier.texture_coords_object`
- `WorldTextureSlot.object`

2.4.413 ObjectActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ObjectActuator` (*Actuator*)

Actuator to control the object movement

angular_velocity

Angular velocity

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

damping

Number of frames to reach the target velocity

Type int in $[-32768, 32767]$, default 0

derivate_coefficient

Not required, high values can cause instability

Type float in $[-inf, inf]$, default 0.0

force

Force

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

force_max_x

Upper limit for X force

Type float in [-inf, inf], default 0.0

force_max_y

Upper limit for Y force

Type float in [-inf, inf], default 0.0

force_max_z

Upper limit for Z force

Type float in [-inf, inf], default 0.0

force_min_x

Lower limit for X force

Type float in [-inf, inf], default 0.0

force_min_y

Lower limit for Y force

Type float in [-inf, inf], default 0.0

force_min_z

Lower limit for Z force

Type float in [-inf, inf], default 0.0

integral_coefficient

Low value (0.01) for slow response, high value (0.5) for fast response

Type float in [-inf, inf], default 0.0

linear_velocity

Linear velocity (in Servo mode it sets the target relative linear velocity, it will be achieved by automatic application of force - Null velocity is a valid target)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

mode

Specify the motion system

Type enum in ['OBJECT_NORMAL', 'OBJECT_SERVO'], default 'OBJECT_NORMAL'

offset_location

Location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

offset_rotation

Rotation

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

proportional_coefficient

Typical value is 60x integral coefficient

Type float in [-inf, inf], default 0.0

reference_object

Reference object for velocity calculation, leave empty for world reference

Type `Object`

torque

Torque

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

use_add_linear_velocity

Toggles between ADD and SET linV

Type boolean, default False

use_local_angular_velocity

Angular velocity is defined in local coordinates

Type boolean, default False

use_local_force

Force is defined in local coordinates

Type boolean, default False

use_local_linear_velocity

Velocity is defined in local coordinates

Type boolean, default False

use_local_location

Location is defined in local coordinates

Type boolean, default False

use_local_rotation

Rotation is defined in local coordinates

Type boolean, default False

use_local_torque

Torque is defined in local coordinates

Type boolean, default False

use_servo_limit_x

Set limit to force along the X axis

Type boolean, default False

use_servo_limit_y

Set limit to force along the Y axis

Type boolean, default False

use_servo_limit_z

Set limit to force along the Z axis

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`

- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.414 ObjectBase(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ObjectBase` (*bpy_struct*)

An object instance in a scene

layers

Layers the object base is on

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

object

Object this base links to

Type `Object`, (readonly)

select

Object base selection state

Type boolean, default False

layers_from_view (*view*)

Sets the object layers from a 3D View (use when adding an object in local view)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.object_bases`
- `SceneBases.active`
- `SceneObjects.link`

2.4.415 ObjectConstraints(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ObjectConstraints` (*bpy_struct*)

Collection of object constraints

active

Active Object constraint

Type `Constraint`

new (*type*)

Add a new constraint to this object

Parameters **type** (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP']*) – Constraint type to add

- `CAMERA_SOLVER` Camera Solver.
- `FOLLOW_TRACK` Follow Track.
- `COPY_LOCATION` Copy Location.
- `COPY_ROTATION` Copy Rotation.
- `COPY_SCALE` Copy Scale.

- `COPY_TRANSFORMS` Copy Transforms.
- `LIMIT_DISTANCE` Limit Distance.
- `LIMIT_LOCATION` Limit Location.
- `LIMIT_ROTATION` Limit Rotation.
- `LIMIT_SCALE` Limit Scale.
- `MAINTAIN_VOLUME` Maintain Volume.
- `TRANSFORM` Transformation.
- `CLAMP_TO` Clamp To.
- `DAMPED_TRACK` Damped Track, Tracking by taking the shortest path.
- `IK` Inverse Kinematics.
- `LOCKED_TRACK` Locked Track, Tracking along a single axis.
- `SPLINE_IK` Spline IK.
- `STRETCH_TO` Stretch To.
- `TRACK_TO` Track To, Legacy tracking constraint prone to twisting artifacts.
- `ACTION` Action.
- `CHILD_OF` Child Of.
- `FLOOR` Floor.
- `FOLLOW_PATH` Follow Path.
- `PIVOT` Pivot.
- `RIGID_BODY_JOINT` Rigid Body Joint.
- `SCRIPT` Script.
- `SHRINKWRAP` Shrinkwrap.

Returns New constraint

Return type `Constraint`

remove (*constraint*)

Remove a constraint from this object

Parameters `constraint` (`Constraint`, (never `None`)) – Removed constraint

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.constraints`

2.4.416 ObjectModifiers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ObjectModifiers` (*bpy_struct*)
Collection of object modifiers

new (*name, type*)

Add a new modifier

Parameters

- **name** (*string*) – New name for the bone
- **type** (*enum in ['UV_PROJECT', 'VERTEX_WEIGHT_EDIT', 'VERTEX_WEIGHT_MIX', 'VERTEX_WEIGHT_PROXIMITY', 'ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SOLIDIFY', 'SUBSURF', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH_DEFORM', 'SHRINKWRAP', 'SIMPLE_DEFORM', 'SMOOTH', 'WARP', 'WAVE', 'CLOTH', 'COLLISION', 'DYNAMIC_PAINT', 'EXPLODE', 'FLUID_SIMULATION', 'OCEAN', 'PARTICLE_INSTANCE', 'PARTICLE_SYSTEM', 'SMOKE', 'SOFT_BODY', 'SURFACE']*) – Modifier type to add

Returns Newly created modifier

Return type `Modifier`

remove (*modifier*)

Remove an existing modifier from the object

Parameters **modifier** (`Modifier`, (never `None`)) – Modifier to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.modifiers`

2.4.417 ObstacleFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.ObstacleFluidSettings` (*FluidSettings*)

Fluid simulation settings for obstacles in the simulation

impact_factor

This is an unphysical value for moving objects - it controls the impact an obstacle has on the fluid, =0 behaves a bit like outflow (deleting fluid), =1 is default, while >1 results in high forces. Can be used to tweak total mass

Type float in [-2, 10], default 0.0

partial_slip_factor

Amount of mixing between no- and free-slip, 0 is no slip and 1 is free slip

Type float in [0, 1], default 0.0

slip_type

• **NOSLIP** No Slip, Obstacle causes zero normal and tangential velocity (=sticky). Default for all. Only option for moving objects.

• **PARTIALSLIP** Partial Slip, Mix between no-slip and free-slip. Non moving objects only!.

• **FREESLIP** Free Slip, Obstacle only causes zero normal velocity (=not sticky). Non moving objects only!.

Type enum in ['NOSLIP', 'PARTIALSLIP', 'FREESLIP'], default 'NOSLIP'

use

Object contributes to the fluid simulation

Type boolean, default False

use_animated_mesh

Export this mesh as an animated one. Slower, only use if really necessary (e.g. armatures or parented objects), animated pos/rot/scale IPOs do not require it

Type boolean, default False

volume_initialization

Volume initialization type

- **VOLUME** Volume, Use only the inner volume of the mesh.
- **SHELL** Shell, Use only the outer shell of the mesh.
- **BOTH** Both, Use both the inner volume and the outer shell of the mesh.

Type enum in ['VOLUME', 'SHELL', 'BOTH'], default 'VOLUME'

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.418 OceanModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.OceanModifier` (*Modifier*)

Simulate an ocean surface

bake_foam_fade

Type float in [0, inf], default 0.0

choppiness

Type float in [0, inf], default 0.0

damping

Damp reflected waves going in opposite direction to the wind

Type float in [0, 1], default 0.0

depth

Type float in [0, inf], default 0.0

filepath

Path to a folder to store external baked images

Type string, default ""

foam_coverage

Type float in [-inf, inf], default 0.0

frame_end

Type int in [0, inf], default 0

frame_start

Type int in [0, inf], default 0

geometry_mode

Method of modifying geometry

- GENERATE Generate, Generates ocean surface geometry at the specified resolution.
- DISPLACE Displace, Displaces existing geometry according to simulation.

Type enum in ['GENERATE', 'DISPLACE'], default 'GENERATE'

is_build_enabled

True if the OceanSim modifier is enabled in this build

Type boolean, default False, (readonly)

is_cached

Whether the ocean is using cached data or simulating

Type boolean, default False, (readonly)

random_seed

Type int in [0, inf], default 0

repeat_x

Repetitions of the generated surface in X

Type int in [1, 1024], default 0

repeat_y

Repetitions of the generated surface in Y

Type int in [1, 1024], default 0

resolution

Resolution of the generated surface

Type int in [1, 1024], default 0

size

Type float in [0, inf], default 0.0

spatial_size

Physical size of the simulation domain (m)

Type int in [-inf, inf], default 0**time****Type** float in [0, inf], default 0.0**use_foam**

Generates foam mask as a vertex color channel

Type boolean, default False**use_normals**

Outputs normals for bump mapping - disabling can speed up performance if its not needed

Type boolean, default False**wave_alignment****Type** float in [0, 10], default 0.0**wave_direction****Type** float in [-inf, inf], default 0.0**wave_scale****Type** float in [0, inf], default 0.0**wave_scale_min**

Shortest allowed wavelength (m)

Type float in [0, inf], default 0.0**wind_velocity**

Wind speed (m/s)

Type float in [-inf, inf], default 0.0**Inherited Properties**

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.419 OceanTexData(bpy_struct)

base class — `bpy_struct`

class `bpy.types.OceanTexData` (*bpy_struct*)
Ocean Texture settings

ocean_object

Object containing the ocean modifier

Type `Object`

output

The data that is output by the texture

- **DISPLACEMENT** Displacement, Output XYZ displacement in RGB channels.
- **FOAM** Foam, Output Foam (wave overlap) amount in single channel.
- **JPLUS** Eigenvalues, Positive Eigenvalues.
- **EMINUS** Eigenvectors (-), Negative Eigenvectors.
- **EPLUS** Eigenvectors (+), Positive Eigenvectors.

Type enum in ['DISPLACEMENT', 'FOAM', 'JPLUS', 'EMINUS', 'EPLUS'], default 'DISPLACEMENT'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `OceanTexture.ocean`

2.4.420 OceanTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.OceanTexture` (*Texture*)
Settings for the Ocean texture

ocean

The ocean data associated with this texture

Type `OceanTexData`, (readonly)

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`

- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.421 Operator(`bpy_struct`)

Basic Operator Example

This script shows simple operator which prints a message.

Since the operator only has an `Operator.execute` function it takes no user input.

Note: Operator subclasses must be registered before accessing them from blender.

```
import bpy

class HelloWorldOperator(bpy.types.Operator):
    bl_idname = "wm.hello_world"
    bl_label = "Minimal Operator"

    def execute(self, context):
        print("Hello World")
        return {'FINISHED'}

bpy.utils.register_class(HelloWorldOperator)

# test call to the newly defined operator
bpy.ops.wm.hello_world()
```

Invoke Function

`Operator.invoke` is used to initialize the operator from the context at the moment the operator is called. `invoke()` is typically used to assign properties which are then used by `execute()`. Some operators don't have an `execute()` function, removing the ability to be repeated from a script or macro.

This example shows how to define an operator which gets mouse input to execute a function and that this operator can be invoked or executed from the python api.

Also notice this operator defines its own properties, these are different to typical class properties because blender registers them with the operator, to use as arguments when called, saved for operator undo/redo and automatically added into the user interface.

```
import bpy

class SimpleMouseOperator(bpy.types.Operator):
    """ This operator shows the mouse location,
        this string is used for the tooltip and API docs
    """
    bl_idname = "wm.mouse_position"
    bl_label = "Invoke Mouse Operator"

    x = bpy.props.IntProperty()
    y = bpy.props.IntProperty()

    def execute(self, context):
        # rather than printing, use the report function,
        # this way the message appears in the header,
        self.report({'INFO'}, "Mouse coords are %d %d" % (self.x, self.y))
        return {'FINISHED'}

    def invoke(self, context, event):
        self.x = event.mouse_x
        self.y = event.mouse_y
        return self.execute(context)

bpy.utils.register_class(SimpleMouseOperator)

# Test call to the newly defined operator.
# Here we call the operator and invoke it, meaning that the settings are taken
# from the mouse.
bpy.ops.wm.mouse_position('INVOKE_DEFAULT')

# Another test call, this time call execute() directly with pre-defined settings.
bpy.ops.wm.mouse_position('EXEC_DEFAULT', x=20, y=66)
```

Calling a File Selector

This example shows how an operator can use the file selector.

Notice the `invoke` function calls a window manager method and returns `RUNNING_MODAL`, this means the file selector stays open and the operator does not exit immediately after `invoke` finishes.

The file selector runs the operator, calling `Operator.execute` when the user confirms.

The `Operator.poll` function is optional, used to check if the operator can run.

```
import bpy

class ExportSomeData(bpy.types.Operator):
    """Test exporter which just writes hello world"""
    bl_idname = "export.some_data"
    bl_label = "Export Some Data"

    filepath = bpy.props.StringProperty(subtype="FILE_PATH")

    @classmethod
    def poll(cls, context):
        return context.object is not None

    def execute(self, context):
        file = open(self.filepath, 'w')
        file.write("Hello World " + context.object.name)
        return {'FINISHED'}

    def invoke(self, context, event):
        context.window_manager.fileselect_add(self)
        return {'RUNNING_MODAL'}

# Only needed if you want to add into a dynamic menu
def menu_func(self, context):
    self.layout.operator_context = 'INVOKE_DEFAULT'
    self.layout.operator(ExportSomeData.bl_idname, text="Text Export Operator")

# Register and add to the file selector
bpy.utils.register_class(ExportSomeData)
bpy.types.INFO_MT_file_export.append(menu_func)

# test call
bpy.ops.export.some_data('INVOKE_DEFAULT')
```

Dialog Box

This operator uses its `Operator.invoke` function to call a popup.

```
import bpy

class DialogOperator(bpy.types.Operator):
    bl_idname = "object.dialog_operator"
    bl_label = "Simple Dialog Operator"

    my_float = bpy.props.FloatProperty(name="Some Floating Point")
    my_bool = bpy.props.BoolProperty(name="Toggle Option")
    my_string = bpy.props.StringProperty(name="String Value")

    def execute(self, context):
        message = "Popup Values: %f, %d, '%s'" % \
            (self.my_float, self.my_bool, self.my_string)
        self.report({'INFO'}, message)
        return {'FINISHED'}
```



```
def invoke(self, context, event):
    wm = context.window_manager
    return wm.invoke_props_dialog(self)
```

```
bpy.utils.register_class(DialogOperator)
```

```
# test call
bpy.ops.object.dialog_operator(' INVOKE_DEFAULT')
```

Custom Drawing

By default operator properties use an automatic user interface layout. If you need more control you can create your own layout with a `Operator.draw` function.

This works like the `Panel` and `Menu` draw functions, its used for dialogs and file selectors.

```
import bpy

class CustomDrawOperator(bpy.types.Operator):
    bl_idname = "object.custom_draw"
    bl_label = "Simple Modal Operator"

    filepath = bpy.props.StringProperty(subtype="FILE_PATH")

    my_float = bpy.props.FloatProperty(name="Float")
    my_bool = bpy.props.BoolProperty(name="Toggle Option")
    my_string = bpy.props.StringProperty(name="String Value")

    def execute(self, context):
        print()
        return {'FINISHED'}

    def invoke(self, context, event):
        context.window_manager.fileselect_add(self)
        return {'RUNNING_MODAL'}

    def draw(self, context):
        layout = self.layout
        col = layout.column()
        col.label(text="Custom Interface!")

        row = col.row()
        row.prop(self, "my_float")
        row.prop(self, "my_bool")

        col.prop(self, "my_string")

bpy.utils.register_class(CustomDrawOperator)

# test call
bpy.ops.object.custom_draw(' INVOKE_DEFAULT')
```

Modal Execution

This operator defines a `Operator.modal` function which running, handling events until it returns `{'FINISHED'}` or `{'CANCELLED'}`.

Grab, Rotate, Scale and Fly-Mode are examples of modal operators. They are especially useful for interactive tools, your operator can have its own state where keys toggle options as the operator runs.

`Operator.invoke` is used to initialize the operator as being by returning `{'RUNNING_MODAL'}`, initializing the modal loop.

Notice `__init__()` and `__del__()` are declared. For other operator types they are not useful but for modal operators they will be called before the `Operator.invoke` and after the operator finishes.

```
import bpy

class ModalOperator(bpy.types.Operator):
    bl_idname = "object.modal_operator"
    bl_label = "Simple Modal Operator"

    def __init__(self):
        print("Start")

    def __del__(self):
        print("End")

    def execute(self, context):
        context.object.location.x = self.value / 100.0

    def modal(self, context, event):
        if event.type == 'MOUSEMOVE': # Apply
            self.value = event.mouse_x
            self.execute(context)
        elif event.type == 'LEFTMOUSE': # Confirm
            return {'FINISHED'}
        elif event.type in ('RIGHTMOUSE', 'ESC'): # Cancel
            return {'CANCELLED'}

        return {'RUNNING_MODAL'}

    def invoke(self, context, event):
        self.value = event.mouse_x
        self.execute(context)

        print(context.window_manager.modal_handler_add(self))
        return {'RUNNING_MODAL'}

bpy.utils.register_class(ModalOperator)

# test call
bpy.ops.object.modal_operator('INVOKE_DEFAULT')

base class — bpy_struct

class bpy.types.Operator(bpy_struct)
    Storage of an operator being executed, or registered after execution

    bl_description
```

Type string, default ""

bl_idname

Type string, default ""

bl_label

Type string, default ""

bl_options

Options for this operator type

- **REGISTER** Register, Display in the info window and support the redo toolbar panel.
- **UNDO** Undo, Push an undo event (needed for operator redo).
- **BLOCKING** Blocking, Block anything else from using the cursor.
- **MACRO** Macro, Use to check if an operator is a macro.
- **GRAB_POINTER** Grab Pointer, Use so the operator grabs the mouse focus, enables wrapping when continuous grab is enabled.
- **PRESET** Preset, Display a preset button with the operators settings.
- **INTERNAL** Internal, Removes the operator from search results.

Type enum set in {'REGISTER', 'UNDO', 'BLOCKING', 'MACRO', 'GRAB_POINTER', 'PRESET', 'INTERNAL'}, default {'REGISTER'}

has_reports

Operator has a set of reports (warnings and errors) from last execution

Type boolean, default False, (readonly)

layout

Type `UILayout`, (readonly)

name

Type string, default "", (readonly)

properties

Type `OperatorProperties`, (readonly, never None)

report (*type, message*)

report

Parameters

- **type** (*enum set in {'DEBUG', 'INFO', 'OPERATOR', 'WARNING', 'ERROR', 'ERROR_INVALID_INPUT', 'ERROR_INVALID_CONTEXT', 'ERROR_OUT_OF_MEMORY'}*) – Type
- **message** (*string*) – Report Message

classmethod poll (*context*)

Test if the operator can be called or not

Return type boolean

execute (*context*)

Execute the operator

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

check (*context*)

Check the operator settings, return True to signal a change to redraw

Returns result

Return type boolean

invoke (*context, event*)

Invoke the operator

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

modal (*context, event*)

Modal operator function

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

draw (*context*)

Draw function for the operator

cancel (*context*)

Called when the operator is cancelled

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

as_keywords (*ignore=()*)

Return a copy of the properties as a dictionary

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceFileBrowser.active_operator`
- `WindowManager.fileselect_add`
- `WindowManager.invoke_confirm`
- `WindowManager.invoke_popup`
- `WindowManager.invoke_props_dialog`
- `WindowManager.invoke_props_popup`
- `WindowManager.invoke_search_popup`
- `WindowManager.modal_handler_add`
- `WindowManager.operators`

2.4.422 OperatorFileListElement(PropertyGroup)

base classes — `bpy_struct`, `PropertyGroup`

`class bpy.types.OperatorFileListElement` (*PropertyGroup*)

name

the name of a file or directory within a file list

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `PropertyGroup.name`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.423 OperatorMacro(`bpy_struct`)

base class — `bpy_struct`

`class bpy.types.OperatorMacro` (*bpy_struct*)

Storage of a sub operator in a macro after it has been added

properties

Type `OperatorProperties`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.424 OperatorMousePath(PropertyGroup)

base classes — `bpy_struct`, `PropertyGroup`

class `bpy.types.OperatorMousePath` (*PropertyGroup*)

Mouse path values for operators that record such paths

loc

Mouse location

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`

time

Time of mouse location

Type float in `[-inf, inf]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`
- `PropertyGroup.name`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.425 OperatorProperties(bpy_struct)

base class — `bpy_struct`

class `bpy.types.OperatorProperties` (*bpy_struct*)
Input properties of an Operator

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `KeyMapItem.properties`
- `Macro.properties`
- `Operator.properties`
- `OperatorMacro.properties`
- `UILayout.operator`

2.4.426 OperatorStrokeElement(PropertyGroup)

base classes — `bpy_struct`, `PropertyGroup`

class `bpy.types.OperatorStrokeElement` (*PropertyGroup*)

is_start

Type boolean, default False

location

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

mouse

Type float array of 2 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0)

pen_flip

Type boolean, default False

pressure

Tablet pressure

Type float in $[0, 1]$, default 0.0

time

Type float in $[0, \text{inf}]$, default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `PropertyGroup.name`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.427 OrController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.OrController` (*Controller*)

Controller passing on events based on a logical OR operation

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.428 OutflowFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.OutflowFluidSettings` (*FluidSettings*)

Fluid simulation settings for objects removing fluids from the simulation

use

Object contributes to the fluid simulation

Type boolean, default False

use_animated_mesh

Export this mesh as an animated one. Slower, only use if really necessary (e.g. armatures or parented objects), animated pos/rot/scale IPOs do not require it

Type boolean, default False

volume_initialization

Volume initialization type

- **VOLUME** Volume, Use only the inner volume of the mesh.
- **SHELL** Shell, Use only the outer shell of the mesh.
- **BOTH** Both, Use both the inner volume and the outer shell of the mesh.

Type enum in ['VOLUME', 'SHELL', 'BOTH'], default 'VOLUME'

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.429 PackedFile(bpy_struct)

base class — `bpy_struct`

class `bpy.types.PackedFile` (*bpy_struct*)

External file packed into the .blend file

size

Size of packed file in bytes

Type `int` in `[-inf, inf]`, default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `Image.packed_file`
- `Sound.packed_file`
- `VectorFont.packed_file`

2.4.430 Paint(`bpy_struct`)

base class — `bpy_struct`

subclasses — `VertexPaint`, `Sculpt`, `ImagePaint`

class `bpy.types.Paint` (*`bpy_struct`*)

brush

Active Brush

Type `Brush`

show_brush

Type `boolean`, default `False`

show_brush_on_surface

Type `boolean`, default `False`

show_low_resolution

For multires, show low resolution while navigating the view

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.431 Panel(`bpy_struct`)

Basic Panel Example

This script is a simple panel which will draw into the object properties section.

Notice the 'CATEGORY_PT_name' `Panel.bl_idname`, this is a naming convention for panels.

Note: Panel subclasses must be registered for blender to use them.

```
import bpy

class HelloWorldPanel(bpy.types.Panel):
    bl_idname = "OBJECT_PT_hello_world"
    bl_label = "Hello World"
    bl_space_type = 'PROPERTIES'
    bl_region_type = 'WINDOW'
    bl_context = "object"

    def draw(self, context):
        self.layout.label(text="Hello World")

bpy.utils.register_class(HelloWorldPanel)
```

Simple Object Panel

This panel has a `Panel.poll` and `Panel.draw_header` function, even though the contents is basic this closely resembles blenders panels.

```
import bpy

class ObjectSelectPanel(bpy.types.Panel):
    bl_idname = "OBJECT_PT_select"
    bl_label = "Select"
    bl_space_type = 'PROPERTIES'
    bl_region_type = 'WINDOW'
    bl_context = "object"
    bl_options = {'DEFAULT_CLOSED'}

    @classmethod
    def poll(cls, context):
        return (context.object is not None)

    def draw_header(self, context):
        layout = self.layout
        obj = context.object
        layout.prop(obj, "select", text="")

    def draw(self, context):
```

```
layout = self.layout

obj = context.object
row = layout.row()
row.prop(obj, "hide_select")
row.prop(obj, "hide_render")

box = layout.box()
box.label("Selection Tools")
box.operator("object.select_all")
row = box.row()
row.operator("object.select_inverse")
row.operator("object.select_random")
```

```
bpy.utils.register_class(ObjectSelectPanel)
```

Mix-in Classes

A mix-in parent class can be used to share common properties and `Menu.poll` function.

```
import bpy
```

```
class View3DPanel():
    bl_space_type = 'VIEW_3D'
    bl_region_type = 'TOOLS'

    @classmethod
    def poll(cls, context):
        return (context.object is not None)

class PanelOne(View3DPanel, bpy.types.Panel):
    bl_idname = "VIEW3D_PT_test_1"
    bl_label = "Panel One"

    def draw(self, context):
        self.layout.label("Small Class")

class PanelTwo(View3DPanel, bpy.types.Panel):
    bl_idname = "VIEW3D_PT_test_2"
    bl_label = "Panel Two"

    def draw(self, context):
        self.layout.label("Also Small Class")
```

```
bpy.utils.register_class(PanelOne)
bpy.utils.register_class(PanelTwo)
```

base class — `bpy_struct`

```
class bpy.types.Panel(bpy_struct)
    Panel containing UI elements

    bl_context
```

The context in which the panel belongs to. (TODO: explain the possible combinations `bl_context/bl_region_type/bl_space_type`)

Type string, default ""

bl_idname

If this is set, the panel gets a custom ID, otherwise it takes the name of the class used to define the panel. For example, if the class name is "OBJECT_PT_hello", and `bl_idname` is not set by the script, then `bl_idname` = "OBJECT_PT_hello"

Type string, default ""

bl_label

The panel label, shows up in the panel header at the right of the triangle used to collapse the panel

Type string, default ""

bl_options

Options for this panel type

- DEFAULT_CLOSED** Default Closed, Defines if the panel has to be open or collapsed at the time of its creation.
- HIDE_HEADER** Show Header, If set to True, the panel shows a header, which contains a clickable arrow to collapse the panel and the label (see `bl_label`).

Type enum set in {'DEFAULT_CLOSED', 'HIDE_HEADER'}, default {'DEFAULT_CLOSED'}

bl_region_type

The region where the panel is going to be used in

Type enum in ['WINDOW', 'HEADER', 'CHANNELS', 'TEMPORARY', 'UI', 'TOOLS', 'TOOL_PROPS', 'PREVIEW'], default 'WINDOW'

bl_space_type

The space where the panel is going to be used in

Type enum in ['EMPTY', 'VIEW_3D', 'GRAPH_EDITOR', 'OUTLINER', 'PROPERTIES', 'FILE_BROWSER', 'IMAGE_EDITOR', 'INFO', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'DOPE SHEET_EDITOR', 'NLA_EDITOR', 'TIMELINE', 'NODE_EDITOR', 'LOGIC_EDITOR', 'CONSOLE', 'USER_PREFERENCES', 'CLIP_EDITOR'], default 'EMPTY'

layout

Defines the structure of the panel in the UI

Type `UILayout`, (readonly)

text

XXX todo

Type string, default ""

classmethod poll (*context*)

If this method returns a non-null output, then the panel can be drawn

Return type boolean

draw (*context*)

Draw UI elements into the panel UI layout

draw_header (*context*)

Draw UI elements into the panel's header UI layout

classmethod append (*draw_func*)

Append a draw function to this menu, takes the same arguments as the menu draw function

classmethod prepend (*draw_func*)

Prepend a draw function to this menu, takes the same arguments as the menu draw function

classmethod remove (*draw_func*)

Remove a draw function that has been added to this menu

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.432 ParentActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ParentActuator` (*Actuator*)

mode

Type enum in ['SETPARENT', 'REMOVEPARENT'], default 'SETPARENT'

object

Set this object as parent

Type `Object`

use_compound

Add this object shape to the parent shape (only if the parent shape is already compound)

Type boolean, default False

use_ghost

Make this object ghost while parented

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.433 Particle(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Particle` (*bpy_struct*)

Particle in a particle system

alive_state

Type enum in ['DEAD', 'UNBORN', 'ALIVE', 'DYING'], default 'DEAD'

angular_velocity

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

birth_time

Type float in [-inf, inf], default 0.0

die_time

Type float in [-inf, inf], default 0.0

hair_keys

Type `bpy_prop_collection` of `ParticleHairKey`, (readonly)

is_exist

Type boolean, default False, (readonly)

is_visible

Type boolean, default False, (readonly)

lifetime

Type float in `[-inf, inf]`, default 0.0

location

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

particle_keys

Type `bpy_prop_collection` of `ParticleKey`, (readonly)

prev_angular_velocity

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

prev_location

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

prev_rotation

Type float array of 4 items in `[-inf, inf]`, default (0.0, 0.0, 0.0, 0.0)

prev_velocity

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

rotation

Type float array of 4 items in `[-inf, inf]`, default (0.0, 0.0, 0.0, 0.0)

size

Type float in `[-inf, inf]`, default 0.0

velocity

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSystem.particles`

2.4.434 ParticleBrush(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ParticleBrush` (*bpy_struct*)
Particle editing brush

count

Particle count

Type int in [1, 1000], default 0

curve

Type `CurveMapping`, (readonly)

length_mode

- GROW Grow, Make hairs longer.
- SHRINK Shrink, Make hairs shorter.

Type enum in ['GROW', 'SHRINK'], default 'GROW'

puff_mode

- ADD Add, Make hairs more puffy.
- SUB Sub, Make hairs less puffy.

Type enum in ['ADD', 'SUB'], default 'ADD'

size

Radius of the brush in pixels

Type int in [1, 32767], default 0

steps

Brush steps

Type int in [1, 32767], default 0

strength

Brush strength

Type float in [0.001, 1], default 0.0

use_puff_volume

Apply puff to unselected end-points (helps maintain hair volume when puffing root)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleEdit.brush`

2.4.435 ParticleDupliWeight(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ParticleDupliWeight` (*bpy_struct*)

Weight of a particle dupliobject in a group

count

The number of times this object is repeated with respect to other objects

Type int in [0, 32767], default 0

name

Particle dupliobject name

Type string, default "", (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSettings.active_dupliweight`
- `ParticleSettings.dupli_weights`

2.4.436 ParticleEdit(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ParticleEdit` (*bpy_struct*)

Properties of particle editing mode

brush

Type `ParticleBrush`, (readonly)

default_key_count

How many keys to make new particles with

Type `int` in [2, 32767], default 0

draw_step

How many steps to draw the path with

Type `int` in [2, 10], default 0

emitter_distance

Distance to keep particles away from the emitter

Type `float` in [0, inf], default 0.0

fade_frames

How many frames to fade

Type `int` in [2, 100], default 0

is_editable

A valid edit mode exists

Type boolean, default False, (readonly)

is_hair

Editing hair

Type boolean, default False, (readonly)

object

The edited object

Type *Object*, (readonly)

select_mode

Particle select and display mode

- PATH Path, Path edit mode.
- POINT Point, Point select mode.
- TIP Tip, Tip select mode.

Type enum in ['PATH', 'POINT', 'TIP'], default 'PATH'

show_particles

Draw actual particles

Type boolean, default False

tool

- NONE None, Don't use any brush.
- COMB Comb, Comb hairs.
- SMOOTH Smooth, Smooth hairs.
- ADD Add, Add hairs.
- LENGTH Length, Make hairs longer or shorter.
- PUFF Puff, Make hairs stand up.
- CUT Cut, Cut hairs.
- WEIGHT Weight, Weight hair particles.

Type enum in ['NONE', 'COMB', 'SMOOTH', 'ADD', 'LENGTH', 'PUFF', 'CUT', 'WEIGHT'], default 'COMB'

type

Type enum in ['PARTICLES', 'SOFT_BODY', 'CLOTH'], default 'PARTICLES'

use_auto_velocity

Calculate point velocities automatically

Type boolean, default False

use_default_interpolate

Interpolate new particles from the existing ones

Type boolean, default False

use_emitter_deflect

Keep paths from intersecting the emitter

Type boolean, default False

use_fade_time

Fade paths and keys further away from current frame

Type boolean, default False

use_preserve_length

Keep path lengths constant

Type boolean, default False

use_preserve_root

Keep root keys unmodified

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ToolSettings.particle_edit`

2.4.437 ParticleFluidSettings(FluidSettings)

base classes — `bpy_struct`, `FluidSettings`

class `bpy.types.ParticleFluidSettings` (*FluidSettings*)

Fluid simulation settings for objects storing fluid particles generated by the simulation

alpha_influence

Amount of particle alpha change, inverse of size influence: 0=off (all same alpha), 1=full. (large particles get lower alphas, smaller ones higher values)

Type float in [0, 2], default 0.0

filepath

Directory (and/or filename prefix) to store and load particles from

Type string, default ""

particle_influence

Amount of particle size scaling: 0=off (all same size), 1=full (range 0.2-2.0), >1=stronger

Type float in [0, 2], default 0.0

show_tracer

Show tracer particles

Type boolean, default False

use_drops

Show drop particles

Type boolean, default False

use_floats

Show floating foam particles

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `FluidSettings.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.438 ParticleHairKey(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ParticleHairKey` (*bpy_struct*)
Particle key for hair particle system

co

Location of the hair key in object space

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

co_hair_space

Location of the hair key in its internal coordinate system, relative to the emitting face

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)

time

Relative time of key over hair length

Type float in $[0, \text{inf}]$, default 0.0

weight

Weight for cloth simulation

Type float in $[0, 1]$, default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Particle.hair_keys`

2.4.439 ParticleInstanceModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ParticleInstanceModifier` (*Modifier*)
Particle system instancing modifier

axis
Pole axis for rotation
Type enum in ['X', 'Y', 'Z'], default 'X'

object
Object that has the particle system
Type `Object`

particle_system_index
Type int in [1, 10], default 0

position
Position along path
Type float in [0, 1], default 0.0

random_position
Randomize position along path
Type float in [0, 1], default 0.0

show_alive
Show instances when particles are alive
Type boolean, default False

show_dead
Show instances when particles are dead
Type boolean, default False

show_unborn
Show instances when particles are unborn
Type boolean, default False

use_children
Create instances from child particles
Type boolean, default False

use_normal
Create instances from normal particles
Type boolean, default False

use_path
Create instances along particle paths
Type boolean, default False

use_preserve_shape
Don't stretch the object
Type boolean, default False

use_size
Use particle size to scale the instances
Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.440 ParticleKey(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ParticleKey` (*bpy_struct*)

Key location for a particle over time

angular_velocity

Key angular velocity

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

location

Key location

Type float array of 3 items in $[-inf, inf]$, default (0.0, 0.0, 0.0)

rotation

Key rotation quaternion

Type float array of 4 items in $[-inf, inf]$, default (0.0, 0.0, 0.0, 0.0)

time

Time of key over the simulation

Type float in [0, inf], default 0.0

velocity

Key velocity

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Particle.particle_keys`

2.4.441 ParticleSettings(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.ParticleSettings` (*ID*)

Particle settings, reusable by multiple particle systems

active_dupliweight

Type `ParticleDupliWeight`, (readonly)

active_dupliweight_index

Type int in [0, inf], default 0

active_texture

Active texture slot being displayed

Type `Texture`

active_texture_index

Index of active texture slot

Type int in [0, 17], default 0

adaptive_angle

How many degrees path has to curve to make another render segment

Type int in [0, 45], default 0

adaptive_pixel

How many pixels path has to cover to make another render segment

Type int in [0, 50], default 0

adaptive_subframes

Automatically set the number of subframes

Type boolean, default False

angular_velocity_factor

Angular velocity amount

Type float in [-200, 200], default 0.0

angular_velocity_mode

Particle angular velocity mode

Type enum in ['NONE', 'SPIN', 'RAND'], default 'NONE'

animation_data

Animation data for this datablock

Type [AnimData](#), (readonly)

apply_effector_to_children

Apply effectors to children

Type boolean, default False

apply_guide_to_children

Type boolean, default False

billboard_align

In respect to what the billboards are aligned

Type enum in ['X', 'Y', 'Z', 'VIEW', 'VEL'], default 'X'

billboard_animation

How to animate billboard textures

Type enum in ['NONE', 'AGE', 'FRAME', 'ANGLE'], default 'NONE'

billboard_object

Billboards face this object (default is active camera)

Type [Object](#)

billboard_offset

Type float array of 2 items in [-100, 100], default (0.0, 0.0)

billboard_offset_split

How to offset billboard textures

Type enum in ['NONE', 'LINEAR', 'RANDOM'], default 'NONE'

billboard_size

Scale billboards relative to particle size

Type float array of 2 items in [0.001, 10], default (0.0, 0.0)

billboard_tilt

Tilt of the billboards

Type float in [-1, 1], default 0.0

billboard_tilt_random

Random tilt of the billboards

Type float in [0, 1], default 0.0

billboard_uv_split

Amount of rows/columns to split UV coordinates for billboards

Type int in [1, 100], default 0

billboard_velocity_head

Scale billboards by velocity

Type float in [0, 10], default 0.0

billboard_velocity_tail

Scale billboards by velocity

Type float in [0, 10], default 0.0

boids

Type *BoidSettings*, (readonly)

branch_threshold

Threshold of branching

Type float in [0, 1], default 0.0

brownian_factor

Specify the amount of Brownian motion

Type float in [0, 200], default 0.0

child_length

Length of child paths

Type float in [0, 1], default 0.0

child_length_threshold

Amount of particles left untouched by child path length

Type float in [0, 1], default 0.0

child_nbr

Amount of children/parent

Type int in [0, 100000], default 0

child_parting_factor

Create parting in the children based on parent strands

Type float in [0, 1], default 0.0

child_parting_max

Maximum root to tip angle (tip distance/root distance for long hair)

Type float in [0, 180], default 0.0

child_parting_min

Minimum root to tip angle (tip distance/root distance for long hair)

Type float in [0, 180], default 0.0

child_radius

Radius of children around parent

Type float in [0, 10], default 0.0

child_roundness

Roundness of children around parent

Type float in [0, 1], default 0.0

child_size

A multiplier for the child particle size

Type float in [0.001, 100000], default 0.0

child_size_random

Random variation to the size of the child particles

Type float in [0, 1], default 0.0

child_type

Create child particles

Type enum in ['NONE', 'SIMPLE', 'INTERPOLATED'], default 'NONE'

clump_factor

Amount of clumping

Type float in [-1, 1], default 0.0

clump_shape

Shape of clumping

Type float in [-0.999, 0.999], default 0.0

color_maximum

Maximum length of the particle color vector

Type float in [0.01, 100], default 0.0

count

Total number of particles

Type int in [0, 10000000], default 0

courant_target

The relative distance a particle can move before requiring more subframes (target Courant number); 0.1-0.3 is the recommended range

Type float in [0.01, 10], default 0.2

create_long_hair_children

Calculate children that suit long hair well

Type boolean, default False

damping

Specify the amount of damping

Type float in [0, 1], default 0.0

distribution

How to distribute particles on selected element

Type enum in ['NONE', 'RENDER', 'DOT', 'CIRC', 'CROSS', 'AXIS'], default 'NONE'

drag_factor

Specify the amount of air-drag

Type float in [0, 1], default 0.0

draw_color

Draw additional particle data as a color

Type enum in ['NONE', 'MATERIAL', 'VELOCITY', 'ACCELERATION'], default 'NONE'

draw_method

How particles are drawn in viewport

Type enum in ['NONE', 'RENDER', 'DOT', 'CIRC', 'CROSS', 'AXIS'], default 'NONE'

draw_percentage

Percentage of particles to display in 3D view

Type int in [0, 100], default 0

draw_size

Size of particles on viewport in pixels (0=default)

Type int in [0, 1000], default 0

draw_step

How many steps paths are drawn with (power of 2)

Type int in [0, 10], default 0

dupli_group

Show Objects in this Group in place of particles

Type Group

dupli_object

Show this Object in place of particles

Type Object

dupli_weights

Weights for all of the objects in the dupli group

Type bpy_prop_collection of ParticleDupliWeight, (readonly)

effect_hair

Hair stiffness for effectors

Type float in [0, 1], default 0.0

effector_amount

How many particles are effectors (0 is all particles)

Type int in [0, 10000], default 0

effector_weights

Type EffectorWeights, (readonly)

emit_from

Where to emit particles from

Type enum in ['VERT', 'FACE', 'VOLUME'], default 'VERT'

factor_random

Give the starting speed a random variation

Type float in [0, 200], default 0.0

fluid

Type SPHFluidSettings, (readonly)

force_field_1

Type FieldSettings, (readonly)

force_field_2

Type FieldSettings, (readonly)

frame_end

Frame # to stop emitting particles

Type float in [-300000, 300000], default 0.0

frame_start

Frame # to start emitting particles

Type float in [-300000, 300000], default 0.0

grid_random

Add random offset to the grid locations

Type float in [0, 1], default 0.0

grid_resolution

The resolution of the particle grid

Type int in [1, 250], default 0

hair_length

Length of the hair

Type float in [0, 1000], default 0.0

hair_step

Number of hair segments

Type int in [2, 50], default 0

hexagonal_grid

Create the grid in a hexagonal pattern

Type boolean, default False

integrator

Algorithm used to calculate physics. Fastest to most stable/accurate: Midpoint, Euler, Verlet, RK4 (Old)

Type enum in ['EULER', 'VERLET', 'MIDPOINT', 'RK4'], default 'EULER'

invert_grid

Invert what is considered object and what is not

Type boolean, default False

is_fluid

Particles were created by a fluid simulation

Type boolean, default False, (readonly)

jitter_factor

Amount of jitter applied to the sampling

Type float in [0, 2], default 0.0

keyed_loops

Number of times the keys are looped

Type int in [1, 10000], default 0

keys_step

Type int in [0, 32767], default 0

kink

Type of periodic offset on the path

Type enum in ['NO', 'CURL', 'RADIAL', 'WAVE', 'BRAID'], default 'NO'

kink_amplitude

The amplitude of the offset

Type float in [-100000, 100000], default 0.0

kink_amplitude_clump

How much clump effects kink amplitude

Type float in [0, 1], default 0.0

kink_axis

Which axis to use for offset

Type enum in ['X', 'Y', 'Z'], default 'X'

kink_flat

How flat the hairs are

Type float in [0, 1], default 0.0

kink_frequency

The frequency of the offset (1/total length)

Type float in [-100000, 100000], default 0.0

kink_shape

Adjust the offset to the beginning/end

Type float in [-0.999, 0.999], default 0.0

length_random

Give path length a random variation

Type float in [0, 1], default 0.0

lifetime

Specify the life span of the particles

Type float in [1, 300000], default 0.0

lifetime_random

Give the particle life a random variation

Type float in [0, 1], default 0.0

line_length_head

Length of the line's head

Type float in [0, 100000], default 0.0

line_length_tail

Length of the line's tail

Type float in [0, 100000], default 0.0

lock_billboard

Lock the billboards align axis

Type boolean, default False

lock_boids_to_surface

Constrain boids to a surface

Type boolean, default False

mass

Specify the mass of the particles

Type float in [0.001, 100000], default 0.0

material

Specify material used for the particles

Type int in [1, 32767], default 0

normal_factor

Let the surface normal give the particle a starting speed

Type float in [-1000, 1000], default 0.0

object_align_factor

Let the emitter object orientation give the particle a starting speed

Type float array of 3 items in [-200, 200], default (0.0, 0.0, 0.0)

object_factor

Let the object give the particle a starting speed

Type float in [-200, 200], default 0.0

particle_factor

Let the target particle give the particle a starting speed

Type float in [-200, 200], default 0.0

particle_size

The size of the particles

Type float in [0.001, 100000], default 0.0

path_end

End time of drawn path

Type float in [-inf, inf], default 0.0

path_start

Starting time of drawn path

Type float in [-inf, inf], default 0.0

phase_factor

Initial rotation phase

Type float in [-1, 1], default 0.0

phase_factor_random

Randomize rotation phase

Type float in [0, 1], default 0.0

physics_type

Particle physics type

Type enum in ['NO', 'NEWTON', 'KEYED', 'BOIDS', 'FLUID'], default 'NO'

react_event

The event of target particles to react on

Type enum in ['DEATH', 'COLLIDE', 'NEAR'], default 'DEATH'

reactor_factor

Let the vector away from the target particles location give the particle a starting speed

Type float in [-10, 10], default 0.0

regrow_hair

Regrow hair for each frame

Type boolean, default False

render_step

How many steps paths are rendered with (power of 2)

Type int in [0, 20], default 0

render_type

How particles are rendered

Type enum in ['NONE', 'HALO', 'LINE', 'PATH', 'OBJECT', 'GROUP', 'BILLBOARD'], default 'NONE'

rendered_child_count

Amount of children/parent for rendering

Type int in [0, 100000], default 0

rotation_factor_random

Randomize rotation

Type float in [0, 1], default 0.0

rotation_mode

Particle rotation axis

Type enum in ['NONE', 'NOR', 'VEL', 'GLOB_X', 'GLOB_Y', 'GLOB_Z', 'OB_X', 'OB_Y', 'OB_Z'], default 'NONE'

roughness_1

Amount of location dependent rough

Type float in [0, 100000], default 0.0

roughness_1_size

Size of location dependent rough

Type float in [0.01, 100000], default 0.0

roughness_2

Amount of random rough

Type float in [0, 100000], default 0.0

- roughness_2_size**
Size of random rough
Type float in [0.01, 100000], default 0.0
- roughness_2_threshold**
Amount of particles left untouched by random rough
Type float in [0, 1], default 0.0
- roughness_end_shape**
Shape of end point rough
Type float in [0, 10], default 0.0
- roughness_endpoint**
Amount of end point rough
Type float in [0, 100000], default 0.0
- show_health**
Draw boid health
Type boolean, default False
- show_number**
Show particle number
Type boolean, default False
- show_size**
Show particle size
Type boolean, default False
- show_unborn**
Show particles before they are emitted
Type boolean, default False
- show_velocity**
Show particle velocity
Type boolean, default False
- simplify_rate**
Speed of simplification
Type float in [0, 1], default 0.0
- simplify_refsize**
Reference size in pixels, after which simplification begins
Type int in [1, 32768], default 0
- simplify_transition**
Transition period for fading out strands
Type float in [0, 1], default 0.0
- simplify_viewport**
Speed of Simplification
Type float in [0, 0.999], default 0.0
- size_random**
Give the particle size a random variation

Type float in [0, 1], default 0.0

subframes

Subframes to simulate for improved stability and finer granularity simulations (dt = timestep / (subframes + 1))

Type int in [0, 1000], default 0

tangent_factor

Let the surface tangent give the particle a starting speed

Type float in [-1000, 1000], default 0.0

tangent_phase

Rotate the surface tangent

Type float in [-1, 1], default 0.0

texture_slots

Texture slots defining the mapping and influence of textures

Type `ParticleSettingsTextureSlots` `bpy_prop_collection` of `ParticleSettingsTextureSlot`, (readonly)

time_tweak

A multiplier for physics timestep (1.0 means one frame = 1/25 seconds)

Type float in [0, 100], default 0.0

timestep

The simulation timestep per frame (seconds per frame)

Type float in [0.0001, 100], default 0.0

trail_count

Number of trail particles

Type int in [1, 100000], default 0

type

Particle Type

Type enum in ['EMITTER', 'HAIR'], default 'EMITTER'

use_absolute_path_time

Path timing is in absolute frames

Type boolean, default False

use_advanced_hair

Use full physics calculations for growing hair

Type boolean, default False

use_dead

Show particles after they have died

Type boolean, default False

use_die_on_collision

Particles die when they collide with a deflector object

Type boolean, default False

use_dynamic_rotation

Sets rotation to dynamic/constant

Type boolean, default False

use_emit_random

Emit in random order of elements

Type boolean, default False

use_even_distribution

Use even distribution from faces based on face areas or edge lengths

Type boolean, default False

use_global_dupli

Use object's global coordinates for duplication

Type boolean, default False

use_group_count

Use object multiple times in the same group

Type boolean, default False

use_group_pick_random

Pick objects from group randomly

Type boolean, default False

use_hair_bspline

Interpolate hair using B-Splines

Type boolean, default False

use_multiply_size_mass

Multiply mass by particle size

Type boolean, default False

use_parent_particles

Render parent particles

Type boolean, default False

use_react_multiple

React multiple times

Type boolean, default False

use_react_start_end

Give birth to unreacted particles eventually

Type boolean, default False

use_render_adaptive

Draw steps of the particle path

Type boolean, default False

use_render_emitter

Render emitter Object also

Type boolean, default False

use_rotation_dupli

Use object's rotation for duplication (global x-axis is aligned particle rotation axis)

Type boolean, default False

use_self_effect

Particle effectors effect themselves

Type boolean, default False

use_simplify

Remove child strands as the object becomes smaller on the screen

Type boolean, default False

use_simplify_viewport

Type boolean, default False

use_size_deflect

Use particle's size in deflection

Type boolean, default False

use_strand_primitive

Use the strand primitive for rendering

Type boolean, default False

use_velocity_length

Multiply line length by particle speed

Type boolean, default False

use_whole_group

Use whole group at once

Type boolean, default False

userjit

Emission locations / face (0 = automatic)

Type int in [0, 1000], default 0

virtual_parents

Relative amount of virtual parents

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.particles`
- `BlendDataParticles.new`
- `BlendDataParticles.remove`
- `ParticleSystem.settings`

2.4.442 ParticleSettingsTextureSlot(TextureSlot)

base classes — `bpy_struct`, `TextureSlot`

class `bpy.types.ParticleSettingsTextureSlot` (*TextureSlot*)
Texture slot for textures in a Particle Settings datablock

clump_factor

Amount texture affects child clump

Type float in [-inf, inf], default 0.0

damp_factor

Amount texture affects particle damping

Type float in [-inf, inf], default 0.0

density_factor

Amount texture affects particle density

Type float in [-inf, inf], default 0.0

field_factor

Amount texture affects particle force fields

Type float in [-inf, inf], default 0.0

gravity_factor

Amount texture affects particle gravity

Type float in [-inf, inf], default 0.0

kink_factor

Amount texture affects child kink

Type float in [-inf, inf], default 0.0

length_factor

Amount texture affects child hair length

Type float in [-inf, inf], default 0.0

life_factor

Amount texture affects particle life time

Type float in [-inf, inf], default 0.0

mapping

- FLAT Flat, Maps X and Y coordinates directly.
- CUBE Cube, Maps using the normal vector.
- TUBE Tube, Maps with Z as central axis.
- SPHERE Sphere, Maps with Z as central axis.

Type enum in ['FLAT', 'CUBE', 'TUBE', 'SPHERE'], default 'FLAT'

mapping_x

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_y

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_z

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

object

Object to use for mapping with Object texture coordinates

Type *Object*

rough_factor

Amount texture affects child roughness

Type float in [-inf, inf], default 0.0

size_factor

Amount texture affects physical particle size

Type float in [-inf, inf], default 0.0

texture_coords

Texture coordinates used to map the texture onto the background

- GLOBAL Global, Uses global coordinates for the texture coordinates.
- OBJECT Object, Uses linked object's coordinates for texture coordinates.
- UV UV, Uses UV coordinates for texture coordinates.
- ORCO Generated, Uses the original undeformed coordinates of the object.
- STRAND Strand / Particle, Uses normalized strand texture coordinate (1D) or particle age (X) and trail position (Y).

Type enum in ['GLOBAL', 'OBJECT', 'UV', 'ORCO', 'STRAND'], default 'GLOBAL'

time_factor

Amount texture affects particle emission time

Type float in [-inf, inf], default 0.0

use_map_clump

Affect the child clumping

Type boolean, default False

use_map_damp

Affect the particle velocity damping

Type boolean, default False

use_map_density

Affect the density of the particles

Type boolean, default False

use_map_field

Affect the particle force fields

Type boolean, default False

use_map_gravity

Affect the particle gravity

Type boolean, default False

use_map_kink

Affect the child kink

Type boolean, default False

use_map_length

Affect the child hair length

Type boolean, default False

use_map_life

Affect the life time of the particles

Type boolean, default False

use_map_rough

Affect the child rough

Type boolean, default False

use_map_size

Affect the particle size

Type boolean, default False

use_map_time

Affect the emission time of the particles

Type boolean, default False

use_map_velocity

Affect the particle initial velocity

Type boolean, default False

uv_layer

UV layer to use for mapping with UV texture coordinates

Type string, default ""

velocity_factor

Amount texture affects particle initial velocity

Type float in [-inf, inf], default 0.0

Inherited Properties

- bpy_struct.id_data
- TextureSlot.name
- TextureSlot.blend_type
- TextureSlot.color
- TextureSlot.default_value
- TextureSlot.invert
- TextureSlot.offset
- TextureSlot.output_node
- TextureSlot.use_rgb_to_intensity
- TextureSlot.scale
- TextureSlot.use_stencil
- TextureSlot.texture

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

References

- ParticleSettings.texture_slots
- ParticleSettingsTextureSlots.add
- ParticleSettingsTextureSlots.create

2.4.443 ParticleSettingsTextureSlots(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ParticleSettingsTextureSlots` (*bpy_struct*)

Collection of texture slots

classmethod `add()`

`add`

Returns The newly initialized `mtx`

Return type `ParticleSettingsTextureSlot`

classmethod `create(index)`

`create`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to initialize

Returns The newly initialized `mtx`

Return type `ParticleSettingsTextureSlot`

classmethod `clear(index)`

`clear`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to clear

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSettings.texture_slots`

2.4.444 ParticleSystem(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ParticleSystem` (*bpy_struct*)

Particle system in an object

active_particle_target

Type `ParticleTarget`, (readonly)

active_particle_target_index

Type `int` in `[0, inf]`, default `0`

billboard_normal_uv

UV Layer to control billboard normals

Type `string`, default `""`

billboard_split_uv

UV Layer to control billboard splitting

Type `string`, default `""`

billboard_time_index_uv

UV Layer to control billboard time index (X-Y)

Type `string`, default `""`

child_particles

Child particles generated by the particle system

Type `bpy_prop_collection` of `ChildParticle`, (readonly)

child_seed

Offset in the random number table for child particles, to get a different randomized result

Type `int` in `[0, inf]`, default `0`

cloth

Cloth dynamics for hair

Type `ClothModifier`, (readonly, never `None`)

dt_frac

The current simulation time step size, as a fraction of a frame

Type `float` in `[0.00990099, 1]`, default `0.0`, (readonly)

has_multiple_caches

Particle system has multiple point caches

Type `boolean`, default `False`, (readonly)

invert_vertex_group_clump

Negate the effect of the clump vertex group

Type `boolean`, default `False`

invert_vertex_group_density

Negate the effect of the density vertex group

Type `boolean`, default `False`

invert_vertex_group_field

Negate the effect of the field vertex group

Type boolean, default False

invert_vertex_group_kink

Negate the effect of the kink vertex group

Type boolean, default False

invert_vertex_group_length

Negate the effect of the length vertex group

Type boolean, default False

invert_vertex_group_rotation

Negate the effect of the rotation vertex group

Type boolean, default False

invert_vertex_group_roughness_1

Negate the effect of the roughness 1 vertex group

Type boolean, default False

invert_vertex_group_roughness_2

Negate the effect of the roughness 2 vertex group

Type boolean, default False

invert_vertex_group_roughness_end

Negate the effect of the roughness end vertex group

Type boolean, default False

invert_vertex_group_size

Negate the effect of the size vertex group

Type boolean, default False

invert_vertex_group_tangent

Negate the effect of the tangent vertex group

Type boolean, default False

invert_vertex_group_velocity

Negate the effect of the velocity vertex group

Type boolean, default False

is_editable

Particle system can be edited in particle mode

Type boolean, default False, (readonly)

is_edited

Particle system has been edited in particle mode

Type boolean, default False, (readonly)

is_global_hair

Hair keys are in global coordinate space

Type boolean, default False, (readonly)

name

Particle system name

Type string, default ""

parent

Use this object's coordinate system instead of global coordinate system

Type `Object`

particles

Particles generated by the particle system

Type `bpy_prop_collection` of `Particle`, (readonly)

point_cache

Type `PointCache`, (readonly, never None)

reactor_target_object

For reactor systems, the object that has the target particle system (empty if same object)

Type `Object`

reactor_target_particle_system

For reactor systems, index of particle system on the target object

Type `int` in [1, 32767], default 0

seed

Offset in the random number table, to get a different randomized result

Type `int` in [0, inf], default 0

settings

Particle system settings

Type `ParticleSettings`, (never None)

targets

Target particle systems

Type `bpy_prop_collection` of `ParticleTarget`, (readonly)

use_hair_dynamics

Enable hair dynamics using cloth simulation

Type `boolean`, default `False`

use_keyed_timing

Use key times

Type `boolean`, default `False`

vertex_group_clump

Vertex group to control clump

Type `string`, default ""

vertex_group_density

Vertex group to control density

Type `string`, default ""

vertex_group_field

Vertex group to control field

Type `string`, default ""

vertex_group_kink

Vertex group to control kink

Type string, default ""

vertex_group_length

Vertex group to control length

Type string, default ""

vertex_group_rotation

Vertex group to control rotation

Type string, default ""

vertex_group_roughness_1

Vertex group to control roughness 1

Type string, default ""

vertex_group_roughness_2

Vertex group to control roughness 2

Type string, default ""

vertex_group_roughness_end

Vertex group to control roughness end

Type string, default ""

vertex_group_size

Vertex group to control size

Type string, default ""

vertex_group_tangent

Vertex group to control tangent

Type string, default ""

vertex_group_velocity

Vertex group to control velocity

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `DynamicPaintBrushSettings.particle_system`
- `Object.particle_systems`
- `ParticleSystemModifier.particle_system`
- `ParticleSystems.active`
- `PointDensity.particle_system`
- `SmokeFlowSettings.particle_system`

2.4.445 ParticleSystemModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ParticleSystemModifier` (*Modifier*)
Particle system simulation modifier

particle_system

Particle System that this modifier controls

Type `ParticleSystem`, (readonly, never `None`)

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.446 ParticleSystems(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ParticleSystems` (*bpy_struct*)
Collection of particle systems

active

Active particle system being displayed

Type `ParticleSystem`, (readonly)

active_index

Index of active particle system slot

Type `int` in `[0, inf]`, default `0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.particle_systems`

2.4.447 ParticleTarget(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ParticleTarget` (*bpy_struct*)
Target particle system

alliance
Type enum in ['FRIEND', 'NEUTRAL', 'ENEMY'], default 'NEUTRAL'

duration
Type float in [0, 30000], default 0.0

is_valid
Keyed particles target is valid
Type boolean, default False

name
Particle target name
Type string, default "", (readonly)

object
The object that has the target particle system (empty if same object)
Type `Object`

system
The index of particle system on the target object
Type int in [1, inf], default 0

time
Type float in [0, 30000], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSystem.active_particle_target`
- `ParticleSystem.targets`

2.4.448 PivotConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.PivotConstraint` (*Constraint*)

Rotate around a different point

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

offset

Offset of pivot from target (when set), or from owner's location (when Fixed Position is off), or the absolute pivot point

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

rotation_range

Rotation range on which pivoting should occur

- `ALWAYS_ACTIVE` Always, Use the pivot point in every rotation.
- `NX` -X Rot, Use the pivot point in the negative rotation range around the X-axis.
- `NY` -Y Rot, Use the pivot point in the negative rotation range around the Y-axis.
- `NZ` -Z Rot, Use the pivot point in the negative rotation range around the Z-axis.
- `X` X Rot, Use the pivot point in the positive rotation range around the X-axis.
- `Y` Y Rot, Use the pivot point in the positive rotation range around the Y-axis.
- `Z` Z Rot, Use the pivot point in the positive rotation range around the Z-axis.

Type enum in ['ALWAYS_ACTIVE', 'NX', 'NY', 'NZ', 'X', 'Y', 'Z'], default 'NX'

subtarget

Type string, default ""

target

Target Object, defining the position of the pivot when defined

Type `Object`

use_relative_location

Offset will be an absolute point in space instead of relative to the target

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`

- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.449 PluginSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

class `bpy.types.PluginSequence` (*EffectSequence*)
Sequence strip applying an effect, loaded from an external plugin

filename

Type string, default "", (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`

- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`
- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`
- `EffectSequence.strobe`
- `EffectSequence.ttransform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.450 PluginTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.PluginTexture` (*Texture*)

External plugin texture

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.451 PointCache(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.PointCache` (*`bpy_struct`*)
Point cache for physics simulations

compression

Compression method to be used

- **NO** No, No compression.
- **LIGHT** Light, Fast but not so effective compression.
- **HEAVY** Heavy, Effective but slow compression.

Type enum in ['NO', 'LIGHT', 'HEAVY'], default 'NO'

filepath

Cache file path

Type string, default ""

frame_end

Frame on which the simulation stops

Type int in [1, 300000], default 0

frame_start

Frame on which the simulation starts

Type int in [1, 300000], default 0

frame_step

Number of frames between cached frames

Type int in [1, 20], default 0

frames_skipped

Type boolean, default False, (readonly)

index

Index number of cache files

Type int in [-1, 100], default 0

info

Info on current cache status

Type string, default "", (readonly)

is_baked

Type boolean, default False, (readonly)

is_baking

Type boolean, default False, (readonly)

is_outdated

Type boolean, default False, (readonly)

name

Cache name

Type string, default ""

point_caches

Point cache list

Type `PointCaches bpy_prop_collection of PointCache`, (readonly)

use_disk_cache

Save cache files to disk (.blend file must be saved first)

Type boolean, default False

use_external

Read cache from an external location

Type boolean, default False

use_library_path

Use this files path when library linked into another file

Type boolean, default False

use_quick_cache

Update simulation with cache steps

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ClothModifier.point_cache`
- `DynamicPaintSurface.point_cache`
- `ParticleSystem.point_cache`
- `PointCache.point_caches`
- `SmokeDomainSettings.point_cache`
- `SoftBodyModifier.point_cache`

2.4.452 PointCaches(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.PointCaches` (*bpy_struct*)
Collection of point caches

active_index

Type `int` in `[0, inf]`, default `0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `PointCache.point_caches`

2.4.453 PointDensity(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.PointDensity` (*bpy_struct*)

Point density settings

color_ramp

Type `ColorRamp`, (readonly)

color_source

Data to derive color results from

- `CONSTANT` Constant.
- `PARTICLE_AGE` Particle Age, Lifetime mapped as 0.0 - 1.0 intensity.
- `PARTICLE_SPEED` Particle Speed, Particle speed (absolute magnitude of velocity) mapped as 0.0-1.0 intensity.
- `PARTICLE_VELOCITY` Particle Velocity, XYZ velocity mapped to RGB colors.

Type enum in [`'CONSTANT'`, `'PARTICLE_AGE'`, `'PARTICLE_SPEED'`, `'PARTICLE_VELOCITY'`], default `'CONSTANT'`

falloff

Method of attenuating density by distance from the point

- `STANDARD` Standard.
- `SMOOTH` Smooth.
- `SOFT` Soft.
- `CONSTANT` Constant, Density is constant within lookup radius.
- `ROOT` Root.
- `PARTICLE_AGE` Particle Age.
- `PARTICLE_VELOCITY` Particle Velocity.

Type enum in [`'STANDARD'`, `'SMOOTH'`, `'SOFT'`, `'CONSTANT'`, `'ROOT'`, `'PARTICLE_AGE'`, `'PARTICLE_VELOCITY'`], default `'STANDARD'`

falloff_curve

Type `CurveMapping`, (readonly)

falloff_soft

Softness of the 'soft' falloff option

Type float in [0.01, inf], default 0.0

falloff_speed_scale

Multiplier to bring particle speed within an acceptable range

Type float in [0.001, 100], default 0.0

noise_basis

Noise formula used for turbulence

- BLENDER_ORIGINAL** Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- ORIGINAL_PERLIN** Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- IMPROVED_PERLIN** Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- VORONOI_F1** Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- VORONOI_F2** Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- VORONOI_F3** Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- VORONOI_F4** Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- VORONOI_F2_F1** Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- VORONOI_CRACKLE** Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- CELL_NOISE** Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

object

Object to take point data from

Type *Object*

particle_cache_space

Coordinate system to cache particles in

Type enum in ['OBJECT_LOCATION', 'OBJECT_SPACE', 'WORLD_SPACE'], default 'OBJECT_LOCATION'

particle_system

Particle System to render as points

Type *ParticleSystem*

point_source

Point data to use as renderable point density

- PARTICLE_SYSTEM** Particle System, Generate point density from a particle system.
- OBJECT** Object Vertices, Generate point density from an object's vertices.

Type enum in ['PARTICLE_SYSTEM', 'OBJECT'], default 'PARTICLE_SYSTEM'

radius

Radius from the shaded sample to look for points within

Type float in [0.001, inf], default 0.0

speed_scale

Multiplier to bring particle speed within an acceptable range

Type float in [0.001, 100], default 0.0

turbulence_depth

Level of detail in the added turbulent noise

Type int in [0, 30], default 0

turbulence_influence

Method for driving added turbulent noise

- **STATIC** Static, Noise patterns will remain unchanged, faster and suitable for stills.
- **PARTICLE_VELOCITY** Particle Velocity, Turbulent noise driven by particle velocity.
- **PARTICLE_AGE** Particle Age, Turbulent noise driven by the particle's age between birth and death.
- **GLOBAL_TIME** Global Time, Turbulent noise driven by the global current frame.

Type enum in ['STATIC', 'PARTICLE_VELOCITY', 'PARTICLE_AGE', 'GLOBAL_TIME'], default 'STATIC'

turbulence_scale

Scale of the added turbulent noise

Type float in [0.01, inf], default 0.0

turbulence_strength

Type float in [0.01, inf], default 0.0

use_falloff_curve

Use a custom falloff curve

Type boolean, default False

use_turbulence

Add directed noise to the density at render-time

Type boolean, default False

vertex_cache_space

Coordinate system to cache vertices in

Type enum in ['OBJECT_LOCATION', 'OBJECT_SPACE', 'WORLD_SPACE'], default 'OBJECT_LOCATION'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `PointDensityTexture.point_density`

2.4.454 PointDensityTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.PointDensityTexture` (*Texture*)
Settings for the Point Density texture

point_density

The point density settings associated with this texture

Type `PointDensity`, (readonly)

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`

- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.455 PointLamp(Lamp)

base classes — `bpy_struct`, `ID`, `Lamp`

class `bpy.types.PointLamp` (*Lamp*)
Omnidirectional point lamp

falloff_curve
Custom Lamp Falloff Curve

Type `CurveMapping`, (readonly)

falloff_type

Intensity Decay with distance

Type enum in ['CONSTANT', 'INVERSE_LINEAR', 'INVERSE_SQUARE', 'CUSTOM_CURVE', 'LINEAR_QUADRATIC_WEIGHTED'], default 'CONSTANT'

linear_attenuation

Linear distance attenuation

Type float in [0, 1], default 0.0

quadratic_attenuation

Quadratic distance attenuation

Type float in [0, 1], default 0.0

shadow_adaptive_threshold

Threshold for Adaptive Sampling (Raytraced shadows)

Type float in [0, 1], default 0.0

shadow_color

Color of shadows cast by the lamp

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

shadow_method

Method to compute lamp shadow with

- NOSHADOW No Shadow.
- RAY_SHADOW Ray Shadow, Use ray tracing for shadow.

Type enum in ['NOSHADOW', 'RAY_SHADOW'], default 'NOSHADOW'

shadow_ray_sample_method

Method for generating shadow samples: Adaptive QMC is fastest, Constant QMC is less noisy but slower

Type enum in ['ADAPTIVE_QMC', 'CONSTANT_QMC'], default 'ADAPTIVE_QMC'

shadow_ray_samples

Amount of samples taken extra (samples x samples)

Type int in [1, 64], default 0

shadow_soft_size

Light size for ray shadow sampling (Raytraced shadows)

Type float in [-inf, inf], default 0.0

use_only_shadow

Causes light to cast shadows only without illuminating objects

Type boolean, default False

use_shadow_layer

Causes only objects on the same layer to cast shadows

Type boolean, default False

use_sphere

Sets light intensity to zero beyond lamp distance

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Lamp.active_texture`
- `Lamp.active_texture_index`
- `Lamp.animation_data`
- `Lamp.color`
- `Lamp.use_diffuse`
- `Lamp.distance`
- `Lamp.energy`
- `Lamp.use_own_layer`
- `Lamp.use_negative`
- `Lamp.node_tree`
- `Lamp.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`
- `Lamp.use_nodes`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.456 PointerProperty(Property)

base classes — `bpy_struct`, `Property`

class `bpy.types.PointerProperty` (*Property*)
 RNA pointer property to point to another RNA struct

fixed_type
 Fixed pointer type, empty if variable type

Type `Struct`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.457 Pose(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Pose` (*bpy_struct*)

A collection of pose channels, including settings for animating bones

animation_visualisation

Animation data for this datablock

Type `AnimViz`, (readonly, never None)

bone_groups

Groups of the bones

Type `BoneGroups` `bpy_prop_collection` of `BoneGroup`, (readonly)

bones

Individual pose bones for the armature

Type `bpy_prop_collection` of `PoseBone`, (readonly)

ik_param

Parameters for IK solver

Type `IKParam`, (readonly)

ik_solver

Selection of IK solver for IK chain, current choice is 0 for Legacy, 1 for iTaSC

- LEGACY Legacy, Original IK solver.
- ITASC iTaSC, Multi constraint, stateful IK solver.

Type `enum` in ['LEGACY', 'ITASC'], default 'LEGACY'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.pose`

2.4.458 PoseBone(bpy_struct)

base class — `bpy_struct`

class `bpy.types.PoseBone` (*bpy_struct*)

Channel defining pose data for a bone in a Pose

bone

Bone associated with this PoseBone

Type `Bone`, (readonly, never None)

bone_group

Bone Group this pose channel belongs to

Type `BoneGroup`

bone_group_index

Bone Group this pose channel belongs to (0=no group)

Type `int` in `[-32768, 32767]`, default 0

child

Child of this pose bone

Type `PoseBone`, (readonly)

constraints

Constraints that act on this PoseChannel

Type `PoseBoneConstraints` `bpy_prop_collection` of `Constraint`, (readonly)

custom_shape

Object that defines custom draw type for this bone

Type `Object`

custom_shape_transform

Bone that defines the display transform of this custom shape

Type `PoseBone`

head

Location of head of the channel's bone

Type `float` array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`, (readonly)

ik_linear_weight

Weight of scale constraint for IK

Type `float` in `[0, 1]`, default 0.0

ik_max_x

Maximum angles for IK Limit

Type `float` in `[0, 3.14159]`, default 0.0

ik_max_y

Maximum angles for IK Limit

Type float in [0, 3.14159], default 0.0

ik_max_z

Maximum angles for IK Limit

Type float in [0, 3.14159], default 0.0

ik_min_x

Minimum angles for IK Limit

Type float in [-3.14159, 0], default 0.0

ik_min_y

Minimum angles for IK Limit

Type float in [-3.14159, 0], default 0.0

ik_min_z

Minimum angles for IK Limit

Type float in [-3.14159, 0], default 0.0

ik_rotation_weight

Weight of rotation constraint for IK

Type float in [0, 1], default 0.0

ik_stiffness_x

IK stiffness around the X axis

Type float in [0, 0.99], default 0.0

ik_stiffness_y

IK stiffness around the Y axis

Type float in [0, 0.99], default 0.0

ik_stiffness_z

IK stiffness around the Z axis

Type float in [0, 0.99], default 0.0

ik_stretch

Allow scaling of the bone for IK

Type float in [0, 1], default 0.0

is_in_ik_chain

Is part of an IK chain

Type boolean, default False, (readonly)

location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

lock_ik_x

Disallow movement around the X axis

Type boolean, default False

lock_ik_y

Disallow movement around the Y axis

Type boolean, default False

lock_ik_z

Disallow movement around the Z axis

Type boolean, default False

lock_location

Lock editing of location in the interface

Type boolean array of 3 items, default (False, False, False)

lock_rotation

Lock editing of rotation in the interface

Type boolean array of 3 items, default (False, False, False)

lock_rotation_w

Lock editing of 'angle' component of four-component rotations in the interface

Type boolean, default False

lock_rotations_4d

Lock editing of four component rotations by components (instead of as Eulers)

Type boolean, default False

lock_scale

Lock editing of scale in the interface

Type boolean array of 3 items, default (False, False, False)

matrix

Final 4x4 matrix after constraints and drivers are applied (object space)

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_basis

Alternative access to location/scale/rotation relative to the parent and own rest bone

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

matrix_channel

4x4 matrix, before constraints

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0), (readonly)

motion_path

Motion Path for this element

Type `MotionPath`, (readonly)

name

Type string, default ""

parent

Parent of this pose bone

Type `PoseBone`, (readonly)

rotation_axis_angle

Angle of Rotation for Axis-Angle rotation representation

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 1.0, 0.0)

rotation_euler

Rotation in Eulers

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

rotation_mode

- QUATERNION Quaternion (WXYZ), No Gimbal Lock (default).
- XYZ XYZ Euler, XYZ Rotation Order (prone to Gimbal Lock).
- XZY XZY Euler, XZY Rotation Order (prone to Gimbal Lock).
- YXZ YXZ Euler, YXZ Rotation Order (prone to Gimbal Lock).
- YZX YZX Euler, YZX Rotation Order (prone to Gimbal Lock).
- ZXY ZXY Euler, ZXY Rotation Order (prone to Gimbal Lock).
- ZYZ ZYX Euler, ZYX Rotation Order (prone to Gimbal Lock).
- AXIS_ANGLE Axis Angle, Axis Angle (W+XYZ), defines a rotation around some axis defined by 3D-Vector.

Type enum in ['QUATERNION', 'XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYZ', 'AXIS_ANGLE'], default 'QUATERNION'

rotation_quaternion

Rotation in Quaternions

Type float array of 4 items in [-inf, inf], default (1.0, 0.0, 0.0, 0.0)

scale

Type float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)

tail

Location of tail of the channel's bone

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0), (readonly)

use_ik_limit_x

Limit movement around the X axis

Type boolean, default False

use_ik_limit_y

Limit movement around the Y axis

Type boolean, default False

use_ik_limit_z

Limit movement around the Z axis

Type boolean, default False

use_ik_linear_control

Apply channel size as IK constraint if stretching is enabled

Type boolean, default False

use_ik_rotation_control

Apply channel rotation as IK constraint

Type boolean, default False

basename

The name of this bone before any ‘.’ character (readonly)

center

The midpoint between the head and the tail. (readonly)

children

A list of all the bones children. (readonly)

children_recursive

A list of all children from this bone. (readonly)

children_recursive_basename

Returns a chain of children with the same base name as this bone. Only direct chains are supported, forks caused by multiple children with matching base names will terminate the function and not be returned. (readonly)

length

The distance from head to tail, when set the head is moved to fit the length.

parent_recursive

A list of parents, starting with the immediate parent (readonly)

vector

The direction this bone is pointing. Utility function for (tail - head)
(readonly)

x_axis

Vector pointing down the x-axis of the bone. (readonly)

y_axis

Vector pointing down the x-axis of the bone. (readonly)

z_axis

Vector pointing down the x-axis of the bone. (readonly)

evaluate_envelope (*point*)

Calculate bone envelope at given point

Parameters **point** (*float array of 3 items in [-inf, inf]*) – Point, Position in 3d space to evaluate

Returns Factor, Envelope factor

Return type float in [-inf, inf]

parent_index (*parent_test*)

The same as ‘bone in other_bone.parent_recursive’ but saved generating a list.

translate (*vec*)

Utility function to add *vec* to the head and tail of this bone

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Pose.bones`
- `PoseBone.child`
- `PoseBone.custom_shape_transform`
- `PoseBone.parent`

2.4.459 PoseBoneConstraints(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.PoseBoneConstraints` (*bpy_struct*)
Collection of pose bone constraints

active

Active PoseChannel constraint

Type `Constraint`

new (*type*)

Add a constraint to this object

Parameters `type` (*enum in ['CAMERA_SOLVER', 'FOLLOW_TRACK', 'COPY_LOCATION', 'COPY_ROTATION', 'COPY_SCALE', 'COPY_TRANSFORMS', 'LIMIT_DISTANCE', 'LIMIT_LOCATION', 'LIMIT_ROTATION', 'LIMIT_SCALE', 'MAINTAIN_VOLUME', 'TRANSFORM', 'CLAMP_TO', 'DAMPED_TRACK', 'IK', 'LOCKED_TRACK', 'SPLINE_IK', 'STRETCH_TO', 'TRACK_TO', 'ACTION', 'CHILD_OF', 'FLOOR', 'FOLLOW_PATH', 'PIVOT', 'RIGID_BODY_JOINT', 'SCRIPT', 'SHRINKWRAP']*) – Constraint type to add

- `CAMERA_SOLVER` Camera Solver.
- `FOLLOW_TRACK` Follow Track.
- `COPY_LOCATION` Copy Location.
- `COPY_ROTATION` Copy Rotation.
- `COPY_SCALE` Copy Scale.
- `COPY_TRANSFORMS` Copy Transforms.
- `LIMIT_DISTANCE` Limit Distance.

- `LIMIT_LOCATION` Limit Location.
- `LIMIT_ROTATION` Limit Rotation.
- `LIMIT_SCALE` Limit Scale.
- `MAINTAIN_VOLUME` Maintain Volume.
- `TRANSFORM` Transformation.
- `CLAMP_TO` Clamp To.
- `DAMPED_TRACK` Damped Track, Tracking by taking the shortest path.
- `IK` Inverse Kinematics.
- `LOCKED_TRACK` Locked Track, Tracking along a single axis.
- `SPLINE_IK` Spline IK.
- `STRETCH_TO` Stretch To.
- `TRACK_TO` Track To, Legacy tracking constraint prone to twisting artifacts.
- `ACTION` Action.
- `CHILD_OF` Child Of.
- `FLOOR` Floor.
- `FOLLOW_PATH` Follow Path.
- `PIVOT` Pivot.
- `RIGID_BODY_JOINT` Rigid Body Joint.
- `SCRIPT` Script.
- `SHRINKWRAP` Shrinkwrap.

Returns New constraint

Return type `Constraint`

remove (*constraint*)

Remove a constraint from this object

Parameters `constraint` (`Constraint`, (never `None`)) – Removed constraint

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `PoseBone.constraints`

2.4.460 Property(`bpy_struct`)

base class — `bpy_struct`

subclasses — `PointerProperty`, `EnumProperty`, `FloatProperty`, `IntProperty`, `CollectionProperty`, `BooleanProperty`, `StringProperty`

class `bpy.types.Property` (*`bpy_struct`*)

RNA property definition

description

Description of the property for tooltips

Type string, default "", (readonly)

identifier

Unique name used in the code and scripting

Type string, default "", (readonly)

is_animatable

Property is animatable through RNA

Type boolean, default False, (readonly)

is_enum_flag

True when multiple enums

Type boolean, default False, (readonly)

is_hidden

True when the property is hidden

Type boolean, default False, (readonly)

is_never_none

True when this value can't be set to None

Type boolean, default False, (readonly)

is_output

True when this property is an output value from an RNA function

Type boolean, default False, (readonly)

is_readonly

Property is editable through RNA

Type boolean, default False, (readonly)

is_registered

Property is registered as part of type registration

Type boolean, default False, (readonly)

is_registered_optional

Property is optionally registered as part of type registration

Type boolean, default False, (readonly)

is_required

False when this property is an optional argument in an RNA function

Type boolean, default False, (readonly)

is_runtime

Property has been dynamically created at runtime

Type boolean, default False, (readonly)

is_skip_save

True when the property is not saved in presets

Type boolean, default False, (readonly)

name

Human readable name

Type string, default "", (readonly)

srna

Struct definition used for properties assigned to this item

Type `Struct`, (readonly)

subtype

Semantic interpretation of the property

Type enum in ['NONE', 'FILE_PATH', 'DIRECTORY_PATH', 'UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'COLOR', 'TRANSLATION', 'DIRECTION', 'MATRIX', 'EULER', 'QUATERNION', 'XYZ', 'COLOR_GAMMA', 'COORDINATES', 'LAYER', 'LAYER_MEMBERSHIP'], default 'NONE', (readonly)

type

Data type of the property

Type enum in ['BOOLEAN', 'INT', 'FLOAT', 'STRING', 'ENUM', 'POINTER', 'COLLECTION'], default 'BOOLEAN', (readonly)

unit

Type of units for this property

Type enum in ['NONE', 'LENGTH', 'AREA', 'VOLUME', 'ROTATION', 'TIME', 'VELOCITY', 'ACCELERATION'], default 'NONE', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Function.parameters`
- `Struct.properties`

2.4.461 PropertyActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.PropertyActuator` (*Actuator*)

Actuator to handle properties

mode

- `ASSIGN` Assign.
- `ADD` Add.
- `COPY` Copy.
- `TOGGLE` Toggle, For bool/int/float/timer properties only.

Type enum in [`'ASSIGN'`, `'ADD'`, `'COPY'`, `'TOGGLE'`], default `'ASSIGN'`

object

Copy from this Object

Type `Object`

object_property

Copy this property

Type string, default `""`

property

The name of the property

Type string, default `""`

value

The name of the property or the value to use (use “” around strings)

Type string, default “”

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.462 PropertyGroup(bpy_struct)**Custom Properties**

PropertyGroups are the base class for dynamically defined sets of properties.

They can be used to extend existing blender data with your own types which can be animated, accessed from the user interface and from python.

Note: The values assigned to blender data are saved to disk but the class definitions are not, this means whenever you load blender the class needs to be registered too.

This is best done by creating an addon which loads on startup and registers your properties.

Note: PropertyGroups must be registered before assigning them to blender data.

See Also:

Property types used in class declarations are all in `bpy.props`

```
import bpy
```

```
class MyPropertyGroup(bpy.types.PropertyGroup):
    custom_1 = bpy.props.FloatProperty(name="My Float")
    custom_2 = bpy.props.IntProperty(name="My Int")

bpy.utils.register_class(MyPropertyGroup)

bpy.types.Object.my_prop_grp = bpy.props.PointerProperty(type=MyPropertyGroup)

# test this worked
bpy.data.objects[0].my_prop_grp.custom_1 = 22.0
```

base class — `bpy_struct`

subclasses — `OperatorFileListElement`, `OperatorMousePath`, `OperatorStrokeElement`

```
class bpy.types.PropertyGroup(bpy_struct)
```

Group of ID properties

name

Unique name used in the code and scripting

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `PropertyGroupItem.collection`

- `PropertyGroupItem.group`
- `PropertyGroupItem.idp_array`

2.4.463 `PropertyGroupItem(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.PropertyGroupItem` (*bpy_struct*)
Property that stores arbitrary, user defined properties

collection

Type `bpy_prop_collection` of `PropertyGroup`, (readonly)

double

Type float in `[-inf, inf]`, default 0.0

double_array

Type float array of 1 items in `[-inf, inf]`, default (0.0)

float

Type float in `[-inf, inf]`, default 0.0

float_array

Type float array of 1 items in `[-inf, inf]`, default (0.0)

group

Type `PropertyGroup`, (readonly)

idp_array

Type `bpy_prop_collection` of `PropertyGroup`, (readonly)

int

Type int in `[-inf, inf]`, default 0

int_array

Type int array of 1 items in `[-inf, inf]`, default (0,)

string

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.464 PropertySensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.PropertySensor` (*Sensor*)

Sensor to detect values and changes in values of properties

evaluation_type

Type of property evaluation

Type enum in ['PROPEQUAL', 'PROPNEQUAL', 'PROPINTERVAL', 'PROPCHANGED'],
default 'PROPEQUAL'

property

Type string, default ""

value

Check for this value in types in Equal or Not Equal types

Type string, default ""

value_max

Specify maximum value in Interval type

Type string, default ""

value_min

Specify minimum value in Interval type

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.465 PythonConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.PythonConstraint` (*Constraint*)

Uses Python script for constraint evaluation

has_script_error

The linked Python script has thrown an error

Type boolean, default False, (readonly)

target_count

Usually only 1-3 are needed

Type int in [-inf, inf], default 0

targets

Target Objects

Type `bpy_prop_collection` of `ConstraintTarget`, (readonly)

text

The text object that contains the Python script

Type `Text`

use_targets

Use the targets indicated in the constraint panel

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`

- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.466 PythonController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.PythonController` (*Controller*)

Controller executing a python script

mode

Python script type (textblock or module - faster)

Type enum in ['SCRIPT', 'MODULE'], default 'SCRIPT'

module

Module name and function to run e.g. "someModule.main". Internal texts and external python files can be used

Type string, default ""

text

Text datablock with the python script

Type Text

use_debug

Continuously reload the module from disk for editing external modules without restarting

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.467 RadarSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.RadarSensor` (*Sensor*)

Sensor to detect objects in a cone shaped radar emanating from the current object

angle

Opening angle of the radar cone (in degrees)

Type float in [0, 179.9], default 0.0

axis

Specify along which axis the radar cone is cast

Type enum in ['XAXIS', 'YAXIS', 'ZAXIS', 'NEGXAXIS', 'NEGYAXIS', 'NEGZAXIS'], default 'XAXIS'

distance

Depth of the radar cone

Type float in [0, 10000], default 0.0

property

Only look for Objects with this property (blank = all objects)

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.468 RandomActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.RandomActuator` (*Actuator*)

chance

Pick a number between 0 and 1, success if it's below this value

Type float in [0, 1], default 0.0

distribution

Choose the type of distribution

Type enum in ['BOOL_CONSTANT', 'BOOL_UNIFORM', 'BOOL_BERNOULLI', 'INT_CONSTANT', 'INT_UNIFORM', 'INT_POISSON', 'FLOAT_CONSTANT', 'FLOAT_UNIFORM', 'FLOAT_NORMAL', 'FLOAT_NEGATIVE_EXPONENTIAL'], default 'BOOL_CONSTANT'

float_max

Choose a number from a range: upper boundary of the range

Type float in [-1000, 1000], default 0.0

float_mean

A normal distribution: mean of the distribution

Type float in [-1000, 1000], default 0.0

float_min

Choose a number from a range: lower boundary of the range

Type float in [-1000, 1000], default 0.0

float_value

Always return this number

Type float in [0, 1], default 0.0

half_life_time

Negative exponential dropoff

Type float in [-1000, 1000], default 0.0

int_max

Choose a number from a range: upper boundary of the range

Type int in [-1000, 1000], default 0

int_mean

Expected mean value of the distribution

Type float in [0.01, 100], default 0.0

int_min

Choose a number from a range: lower boundary of the range

Type int in [-1000, 1000], default 0

int_value

Always return this number

Type int in [-inf, inf], default 0

property

Assign the random value to this property

Type string, default ""

seed

Initial seed of the random generator, use Python for more freedom (choose 0 for not random)

Type int in [0, 300000], default 0

standard_deviation

A normal distribution: standard deviation of the distribution

Type float in [-1000, 1000], default 0.0

use_always_true

Always false or always true

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.469 RandomSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.RandomSensor` (*Sensor*)

Sensor to send random events

seed

Initial seed of the generator. (Choose 0 for not random)

Type int in [0, 1000], default 0

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`

- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`
- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.470 RaySensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.RaySensor` (*Sensor*)

Sensor to detect intersections with a ray emanating from the current object

axis

Specify along which axis the ray is cast

Type enum in ['XAXIS', 'YAXIS', 'ZAXIS', 'NEGXAXIS', 'NEGYAXIS', 'NEGZAXIS'], default 'YAXIS'

material

Only look for Objects with this material (blank = all objects)

Type string, default ""

property

Only look for Objects with this property (blank = all objects)

Type string, default ""

range

Sense objects no farther than this distance

Type float in [0.01, 10000], default 0.0

ray_type

Toggle collision on material or property

- PROPERTY Property, Use a material for ray intersections.
- MATERIAL Material, Use a property for ray intersections.

Type enum in ['PROPERTY', 'MATERIAL'], default 'PROPERTY'

use_x_ray

Toggle X-Ray option (see through objects that don't have the property)

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Sensor.name
- Sensor.show_expanded
- Sensor.frequency
- Sensor.invert
- Sensor.use_level
- Sensor.pin
- Sensor.use_pulse_false_level
- Sensor.use_pulse_true_level
- Sensor.use_tap
- Sensor.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values
- Sensor.link
- Sensor.unlink

2.4.471 Region(bpy_struct)

base class — bpy_struct

```

class bpy.types.Region(bpy_struct)
    Region in a subdivided screen area

    height
        Region height
        Type int in [0, 32767], default 0, (readonly)

    id
        Unique ID for this region
        Type int in [-32768, 32767], default 0, (readonly)

    type
        Type of this region
        Type enum in ['WINDOW', 'HEADER', 'CHANNELS', 'TEMPORARY', 'UI', 'TOOLS',
            'TOOL_PROPS', 'PREVIEW'], default 'WINDOW', (readonly)

    width
        Region width
        Type int in [0, 32767], default 0, (readonly)

    tag_redraw()
        tag_redraw

```

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Area.regions`
- `Context.region`

2.4.472 RegionView3D(bpy_struct)

base class — `bpy_struct`

class `bpy.types.RegionView3D` (*bpy_struct*)

3D View region data

is_perspective

Type boolean, default False

lock_rotation

Lock view rotation in side views

Type boolean, default False

perspective_matrix

Current perspective matrix of the 3D region

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0), (readonly)

show_sync_view

Sync view position between side views

Type boolean, default False

use_box_clip

Clip objects based on what's visible in other side views

Type boolean, default False

view_camera_offset

View shift in camera view

Type float array of 2 items in [-inf, inf], default (0.0, 0.0)

view_camera_zoom

Zoom factor in camera view

Type int in [0, 32767], default 0

view_distance

Distance to the view location

Type float in [0, inf], default 0.0

view_location

View pivot location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

view_matrix

Current view matrix of the 3D region

Type float array of 16 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

view_perspective

View Perspective

Type enum in ['PERSP', 'ORTHO', 'CAMERA'], default 'ORTHO'

view_rotation

Rotation in quaternions (keep normalized)

Type float array of 4 items in $[-inf, inf]$, default (0.0, 0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.region_data`
- `SpaceView3D.region_3d`
- `SpaceView3D.region_quadview`

2.4.473 RenderEngine(bpy_struct)

Simple Render Engine

```
import bpy
```

```
class CustomRenderEngine(bpy.types.RenderEngine):
    # These three members are used by blender to set up the
    # RenderEngine; define its internal name, visible name and capabilities.
    bl_idname = 'custom_renderer'
    bl_label = 'Flat Color Renderer'
    bl_use_preview = True

    # This is the only method called by blender, in this example
    # we use it to detect preview rendering and call the implementation
    # in another method.
    def render(self, scene):
        scale = scene.render.resolution_percentage / 100.0
        self.size_x = int(scene.render.resolution_x * scale)
```

```
self.size_y = int(scene.render.resolution_y * scale)

if scene.name == 'preview':
    self.render_preview(scene)
else:
    self.render_scene(scene)

# In this example, we fill the preview renders with a flat green color.
def render_preview(self, scene):
    pixel_count = self.size_x * self.size_y

    # The framebuffer is defined as a list of pixels, each pixel
    # itself being a list of R,G,B,A values
    green_rect = [[0.0, 1.0, 0.0, 1.0]] * pixel_count

    # Here we write the pixel values to the RenderResult
    result = self.begin_result(0, 0, self.size_x, self.size_y)
    layer = result.layers[0]
    layer.rect = green_rect
    self.end_result(result)

# In this example, we fill the full renders with a flat blue color.
def render_scene(self, scene):
    pixel_count = self.size_x * self.size_y

    # The framebuffer is defined as a list of pixels, each pixel
    # itself being a list of R,G,B,A values
    blue_rect = [[0.0, 0.0, 1.0, 1.0]] * pixel_count

    # Here we write the pixel values to the RenderResult
    result = self.begin_result(0, 0, self.size_x, self.size_y)
    layer = result.layers[0]
    layer.rect = blue_rect
    self.end_result(result)

# Register the RenderEngine
bpy.utils.register_class(CustomRenderEngine)

# RenderEngines also need to tell UI Panels that they are compatible
# Otherwise most of the UI will be empty when the engine is selected.
# In this example, we need to see the main render image button and
# the material preview panel.
from bl_ui import properties_render
properties_render.RENDER_PT_render.COMPAT_ENGINES.add('custom_renderer')
del properties_render

from bl_ui import properties_material
properties_material.MATERIAL_PT_preview.COMPAT_ENGINES.add('custom_renderer')
del properties_material

base class — bpy_struct

class bpy.types.RenderEngine(bpy_struct)
    Render engine

    bl_idname

        Type string, default ""

    bl_label
```

Type string, default ""

bl_use_postprocess

Type boolean, default False

bl_use_preview

Type boolean, default False

bl_use_shading_nodes

Type boolean, default False

is_animation

Type boolean, default False

is_preview

Type boolean, default False

update (*data=None, scene=None*)

Export scene data for render

render (*scene=None*)

Render scene into an image

view_update (*context=None*)

Update on data changes for viewport render

view_draw (*context=None*)

Request update call for viewport rendering

tag_redraw ()

tag_redraw

tag_update ()

tag_update

begin_result (*x, y, w, h*)

begin_result

Parameters

- **x** (*int in [0, inf]*) – X
- **y** (*int in [0, inf]*) – Y
- **w** (*int in [0, inf]*) – Width
- **h** (*int in [0, inf]*) – Height

Returns Result

Return type `RenderResult`

update_result (*result*)

update_result

Parameters **result** (`RenderResult`) – Result

end_result (*result*)
end_result

Parameters **result** (*RenderResult*) – Result

test_break ()
test_break

Returns Break

Return type boolean

update_stats (*stats, info*)
update_stats

Parameters

- **stats** (*string*) – Stats
- **info** (*string*) – Info

update_progress (*progress*)
update_progress

Parameters **progress** (*float in [0, 1]*) – Percentage of render that's done

report (*type, message*)
report

Parameters

- **type** (*enum set in {'DEBUG', 'INFO', 'OPERATOR', 'WARNING', 'ERROR', 'ERROR_INVALID_INPUT', 'ERROR_INVALID_CONTEXT', 'ERROR_OUT_OF_MEMORY'}*) – Type
- **message** (*string*) – Report Message

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.474 RenderLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.RenderLayer` (*bpy_struct*)

exclude_ambient_occlusion

Exclude AO pass from combined

Type boolean, default False, (readonly)

exclude_emit

Exclude emission pass from combined

Type boolean, default False, (readonly)

exclude_environment

Exclude environment pass from combined

Type boolean, default False, (readonly)

exclude_indirect

Exclude indirect pass from combined

Type boolean, default False, (readonly)

exclude_reflection

Exclude raytraced reflection pass from combined

Type boolean, default False, (readonly)

exclude_refraction

Exclude raytraced refraction pass from combined

Type boolean, default False, (readonly)

exclude_shadow

Exclude shadow pass from combined

Type boolean, default False, (readonly)

exclude_specular

Exclude specular pass from combined

Type boolean, default False, (readonly)

invert_zmask

For Zmask, only render what is behind solid z values instead of in front

Type boolean, default False, (readonly)

layers

Scene layers included in this render layer

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False), (readonly)

layers_zmask

Zmask scene layers for solid faces

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False), (readonly)

light_override

Group to override all other lights in this render layer

Type `Group`, (readonly)

material_override

Material to override all other materials in this render layer

Type `Material`, (readonly)

name

Render layer name

Type `string`, default `""`, (readonly)

passes

Type `bpy_prop_collection` of `RenderPass`, (readonly)

rect

Type `float` in `[-inf, inf]`, default `0.0`

use

Disable or enable the render layer

Type `boolean`, default `False`, (readonly)

use_all_z

Fill in Z values for solid faces in invisible layers, for masking

Type `boolean`, default `False`, (readonly)

use_edge_enhance

Render Edge-enhance in this Layer (only works for Solid faces)

Type `boolean`, default `False`, (readonly)

use_halo

Render Halos in this Layer (on top of Solid)

Type `boolean`, default `False`, (readonly)

use_pass_ambient_occlusion

Deliver AO pass

Type `boolean`, default `False`, (readonly)

use_pass_color

Deliver shade-less color pass

Type `boolean`, default `False`, (readonly)

use_pass_combined

Deliver full combined RGBA buffer

Type `boolean`, default `False`, (readonly)

use_pass_diffuse

Deliver diffuse pass

Type `boolean`, default `False`, (readonly)

use_pass_emit

Deliver emission pass

Type `boolean`, default `False`, (readonly)

use_pass_environment

Deliver environment lighting pass

Type boolean, default False, (readonly)

use_pass_indirect

Deliver indirect lighting pass

Type boolean, default False, (readonly)

use_pass_material_index

Deliver material index pass

Type boolean, default False, (readonly)

use_pass_mist

Deliver mist factor pass (0.0-1.0)

Type boolean, default False, (readonly)

use_pass_normal

Deliver normal pass

Type boolean, default False, (readonly)

use_pass_object_index

Deliver object index pass

Type boolean, default False, (readonly)

use_pass_reflection

Deliver raytraced reflection pass

Type boolean, default False, (readonly)

use_pass_refraction

Deliver raytraced refraction pass

Type boolean, default False, (readonly)

use_pass_shadow

Deliver shadow pass

Type boolean, default False, (readonly)

use_pass_specular

Deliver specular pass

Type boolean, default False, (readonly)

use_pass_uv

Deliver texture UV pass

Type boolean, default False, (readonly)

use_pass_vector

Deliver speed vector pass

Type boolean, default False, (readonly)

use_pass_z

Deliver Z values pass

Type boolean, default False, (readonly)

use_sky

Render Sky in this Layer

Type boolean, default False, (readonly)

use_solid

Render Solid faces in this Layer

Type boolean, default False, (readonly)

use_strand

Render Strands in this Layer

Type boolean, default False, (readonly)

use_zmask

Only render what's in front of the solid z values

Type boolean, default False, (readonly)

use_ztransp

Render Z-Transparent faces in this Layer (on top of Solid and Halos)

Type boolean, default False, (readonly)

load_from_file (*filename*, *x=0*, *y=0*)

Copies the pixels of this renderlayer from an image file

Parameters

- **filename** (*string*) – Filename, Filename to load into this render tile, must be no smaller than the renderlayer
- **x** (*int in [0, inf], (optional)*) – Offset X, Offset the position to copy from if the image is larger than the render layer
- **y** (*int in [0, inf], (optional)*) – Offset Y, Offset the position to copy from if the image is larger than the render layer

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `RenderResult.layers`

2.4.475 RenderLayers(bpy_struct)

base class — `bpy_struct`

class `bpy.types.RenderLayers` (*bpy_struct*)

Collection of render layers

active

Active Render Layer

Type `SceneRenderLayer`, (never `None`)

active_index

Active index in render layer array

Type `int` in `[-32768, 32767]`, default `0`

new (*name*)

Add a render layer to scene

Parameters `name` (*string*) – New name for the marker (not unique)

Returns Newly created render layer

Return type `SceneRenderLayer`

remove (*layer*)

Remove a render layer

Parameters `layer` (`SceneRenderLayer`, (never `None`)) – Timeline marker to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `RenderSettings.layers`

2.4.476 `RenderPass(bpy_struct)`

base class — `bpy_struct`

`class bpy.types.RenderPass` (*bpy_struct*)

`channel_id`

Type string, default "", (readonly)

`channels`

Type int in [-inf, inf], default 0, (readonly)

`name`

Type string, default "", (readonly)

`rect`

Type float in [-inf, inf], default 0.0

`type`

Type enum in ['COMBINED', 'Z', 'COLOR', 'DIFFUSE', 'SPECULAR', 'SHADOW', 'AO', 'REFLECTION', 'NORMAL', 'VECTOR', 'REFRACTION', 'OBJECT_INDEX', 'UV', 'MIST', 'EMIT', 'ENVIRONMENT', 'MATERIAL_INDEX'], default 'COMBINED', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `RenderLayer.passes`

2.4.477 RenderResult(bpy_struct)

base class — `bpy_struct`

class `bpy.types.RenderResult` (*bpy_struct*)

Result of rendering, including all layers and passes

layers

Type `bpy_prop_collection` of `RenderLayer`, (readonly)

resolution_x

Type `int` in `[-inf, inf]`, default 0, (readonly)

resolution_y

Type `int` in `[-inf, inf]`, default 0, (readonly)

load_from_file

 (*filename*)

Copies the pixels of this render result from an image file

Parameters `filename` (*string*) – File Name, Filename to load into this render tile, must be no smaller than the render result

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `RenderEngine.begin_result`
- `RenderEngine.end_result`
- `RenderEngine.update_result`

2.4.478 `RenderSettings(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.RenderSettings` (*bpy_struct*)

Rendering settings for a Scene datablock

alpha_mode

Representation of alpha information in the RGBA pixels

- **SKY** Sky, Transparent pixels are filled with sky color.
- **PREMUL** Premultiplied, Transparent RGB pixels are multiplied by the alpha channel.
- **STRAIGHT** Straight Alpha, Transparent RGB and alpha pixels are unmodified.

Type enum in ['SKY', 'PREMUL', 'STRAIGHT'], default 'SKY'

antialiasing_samples

Amount of anti-aliasing samples per pixel

Type enum in ['5', '8', '11', '16'], default '5'

bake_aa_mode

Type enum in ['5', '8', '11', '16'], default '5'

bake_bias

Bias towards faces further away from the object (in blender units)

Type float in [0, 1000], default 0.0

bake_distance

Maximum distance from active object to other object (in blender units)

Type float in [0, 1000], default 0.0

bake_margin

Amount of pixels to extend the baked result with, as post process filter

Type int in [0, 64], default 0

bake_normal_space

Choose normal space for baking

- **CAMERA** Camera, Bake the normals in camera space.
- **WORLD** World, Bake the normals in world space.
- **OBJECT** Object, Bake the normals in object space.
- **TANGENT** Tangent, Bake the normals in tangent space.

Type enum in ['CAMERA', 'WORLD', 'OBJECT', 'TANGENT'], default 'CAMERA'

bake_quad_split

Choose the method used to split a quad into 2 triangles for baking

- AUTO Automatic, Split quads to give the least distortion while baking.
- FIXED Fixed, Split quads predictably (0,1,2) (0,2,3).
- FIXED_ALT Fixed Alternate, Split quads predictably (1,2,3) (1,3,0).

Type enum in ['AUTO', 'FIXED', 'FIXED_ALT'], default 'AUTO'

bake_type

Choose shading information to bake into the image

- FULL Full Render, Bake everything.
- AO Ambient Occlusion, Bake ambient occlusion.
- SHADOW Shadow, Bake shadows.
- NORMALS Normals, Bake normals.
- TEXTURE Textures, Bake textures.
- DISPLACEMENT Displacement, Bake displacement.
- EMIT Emission, Bake Emit values (glow).
- ALPHA Alpha, Bake Alpha values (transparency).
- MIRROR_INTENSITY Mirror Intensity, Bake Mirror values.
- MIRROR_COLOR Mirror Colors, Bake Mirror colors.
- SPEC_INTENSITY Specular Intensity, Bake Specular values.
- SPEC_COLOR Specular Colors, Bake Specular colors.

Type enum in ['FULL', 'AO', 'SHADOW', 'NORMALS', 'TEXTURE', 'DISPLACEMENT', 'EMIT', 'ALPHA', 'MIRROR_INTENSITY', 'MIRROR_COLOR', 'SPEC_INTENSITY', 'SPEC_COLOR'], default 'FULL'

border_max_x

Maximum X value for the render border

Type float in [0, 1], default 0.0

border_max_y

Maximum Y value for the render border

Type float in [0, 1], default 0.0

border_min_x

Minimum X value to for the render border

Type float in [0, 1], default 0.0

border_min_y

Minimum Y value for the render border

Type float in [0, 1], default 0.0

cineon_black

Log conversion reference blackpoint

Type int in [0, 1024], default 0

cineon_gamma

Log conversion gamma

Type float in [0, 10], default 0.0

cineon_white

Log conversion reference whitepoint

Type int in [0, 1024], default 0

color_mode

Choose BW for saving greyscale images, RGB for saving red, green and blue channels, and RGBA for saving red, green, blue and alpha channels

- BW BW, Images get saved in 8 bits grayscale (only PNG, JPEG, TGA, TIF).
- RGB RGB, Images are saved with RGB (color) data.
- RGBA RGBA, Images are saved with RGB and Alpha data (if supported).

Type enum in ['BW', 'RGB', 'RGBA'], default 'BW'

display_mode

Select where rendered images will be displayed

- SCREEN Full Screen, Images are rendered in full Screen.
- AREA Image Editor, Images are rendered in Image Editor.
- WINDOW New Window, Images are rendered in new Window.
- NONE Keep UI, Images are rendered without forcing UI changes, optionally showing result.

Type enum in ['SCREEN', 'AREA', 'WINDOW', 'NONE'], default 'SCREEN'

dither_intensity

Amount of dithering noise added to the rendered image to break up banding

Type float in [0, 2], default 0.0

edge_color

Edge color

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_threshold

Threshold for drawing outlines on geometry edges

Type int in [0, 255], default 0

engine

Engine to use for rendering

- BLENDER_RENDER Blender Render, Use the Blender internal rendering engine for rendering.

Type enum in ['BLENDER_RENDER'], default 'BLENDER_RENDER'

ffmpeg_audio_channels

Audio channel count

- MONO Mono, Set audio channels to mono.
- STEREO Stereo, Set audio channels to stereo.

- SURROUND4 4 Channels, Set audio channels to 4 channels.
- SURROUND51 5.1 Surround, Set audio channels to 5.1 surround sound.
- SURROUND71 7.1 Surround, Set audio channels to 7.1 surround sound.

Type enum in ['MONO', 'STEREO', 'SURROUND4', 'SURROUND51', 'SURROUND71'], default 'MONO'

ffmpeg_audio_mixrate

Audio samplerate(samples/s)

Type int in [8000, 192000], default 0

field_order

Order of video fields (select which lines get rendered first, to create smooth motion for TV output)

- EVEN_FIRST Upper First, Upper field first.
- ODD_FIRST Lower First, Lower field first.

Type enum in ['EVEN_FIRST', 'ODD_FIRST'], default 'EVEN_FIRST'

file_extension

The file extension used for saving renders

Type string, default "", (readonly)

file_format

File format to save the rendered images as

- BMP BMP, Output image in bitmap format.
- IRIS Iris, Output image in (old!) SGI IRIS format.
- PNG PNG, Output image in PNG format.
- JPEG JPEG, Output image in JPEG format.
- TARGA Targa, Output image in Targa format.
- TARGA_RAW Targa Raw, Output image in uncompressed Targa format.
- AVI_JPEG AVI JPEG, Output video in AVI JPEG format.
- AVI_RAW AVI Raw, Output video in AVI Raw format.

Type enum in ['BMP', 'IRIS', 'PNG', 'JPEG', 'TARGA', 'TARGA_RAW', 'AVI_JPEG', 'AVI_RAW'], default 'TARGA'

file_quality

Quality of JPEG images, AVI Jpeg and SGI movies, compression for PNG's

Type int in [0, 100], default 0

filepath

Directory/name to save animations, # characters defines the position and length of frame numbers

Type string, default ""

filter_size

Pixel width over which the reconstruction filter combines samples

Type float in [0.5, 1.5], default 0.0

fps

Framerate, expressed in frames per second

Type int in [1, 120], default 0

fps_base

Framerate base

Type float in [0.1, 120], default 0.0

frame_map_new

How many frames the Map Old will last

Type int in [1, 900], default 0

frame_map_old

Old mapping value in frames

Type int in [1, 900], default 0

has_multiple_engines

More than one rendering engine is available

Type boolean, default False, (readonly)

is_movie_format

When true the format is a movie

Type boolean, default False, (readonly)

layers

Type `RenderLayers bpy_prop_collection` of `SceneRenderLayer`, (readonly)

motion_blur_samples

Number of scene samples to take with motion blur

Type int in [1, 32], default 0

motion_blur_shutter

Time taken in frames between shutter open and close

Type float in [0.01, 10], default 0.0

octree_resolution

Resolution of raytrace accelerator, use higher resolutions for larger scenes

Type enum in ['64', '128', '256', '512'], default '64'

parts_x

Number of horizontal tiles to use while rendering

Type int in [1, 512], default 0

parts_y

Number of vertical tiles to use while rendering

Type int in [1, 512], default 0

pixel_aspect_x

Horizontal aspect ratio - for anamorphic or non-square pixel output

Type float in [1, 200], default 0.0

pixel_aspect_y

Vertical aspect ratio - for anamorphic or non-square pixel output

Type float in [1, 200], default 0.0

pixel_filter_type

Reconstruction filter used for combining anti-aliasing samples

- BOX** Box, Use a box filter for anti-aliasing.
- TENT** Tent, Use a tent filter for anti-aliasing.
- QUADRATIC** Quadratic, Use a quadratic filter for anti-aliasing.
- CUBIC** Cubic, Use a cubic filter for anti-aliasing.
- CATMULLROM** Catmull-Rom, Use a Catmull-Rom filter for anti-aliasing.
- GAUSSIAN** Gaussian, Use a Gaussian filter for anti-aliasing.
- MITCHELL** Mitchell-Netravali, Use a Mitchell-Netravali filter for anti-aliasing.

Type enum in ['BOX', 'TENT', 'QUADRATIC', 'CUBIC', 'CATMULLROM', 'GAUSSIAN', 'MITCHELL'], default 'BOX'

raytrace_method

Type of raytrace accelerator structure

- AUTO** Auto, Automatically select acceleration structure.
- OCTREE** Octree, Use old Octree structure.
- BLIBVH** BLI BVH, Use BLI K-Dop BVH.c.
- VBVH** vBVH, Use vBVH.
- SIMD_SVBVH** SIMD SVBVH, Use SIMD SVBVH.
- SIMD_QBVH** SIMD QBVH, Use SIMD QBVH.

Type enum in ['AUTO', 'OCTREE', 'BLIBVH', 'VBVH', 'SIMD_SVBVH', 'SIMD_QBVH'], default 'AUTO'

resolution_percentage

Percentage scale for render resolution

Type int in [1, 32767], default 0

resolution_x

Number of horizontal pixels in the rendered image

Type int in [4, 10000], default 0

resolution_y

Number of vertical pixels in the rendered image

Type int in [4, 10000], default 0

sequencer_gl_preview

Method to draw in the sequencer view

- BOUNDBOX** Bounding Box, Display the object's local bounding boxes only.
- WIREFRAME** Wireframe, Display the object as wire edges.
- SOLID** Solid, Display the object solid, lit with default OpenGL lights.
- TEXTURED** Texture, Display the object solid, with a texture.

- MATERIAL** Material, Display objects solid, with GLSL material.

- RENDERED** Rendered, Display render preview.

Type enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED', 'MATERIAL', 'RENDERED'], default 'BOUNDBOX'

sequencer_gl_render

Method to draw in the sequencer view

- BOUNDBOX** Bounding Box, Display the object's local bounding boxes only.

- WIREFRAME** Wireframe, Display the object as wire edges.

- SOLID** Solid, Display the object solid, lit with default OpenGL lights.

- TEXTURED** Texture, Display the object solid, with a texture.

- MATERIAL** Material, Display objects solid, with GLSL material.

- RENDERED** Rendered, Display render preview.

Type enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED', 'MATERIAL', 'RENDERED'], default 'BOUNDBOX'

simplify_ao_sss

Global approximate AO and SSS quality factor

Type float in [0, 1], default 0.0

simplify_child_particles

Global child particles percentage

Type float in [0, 1], default 0.0

simplify_shadow_samples

Global maximum shadow samples

Type int in [0, 32767], default 0

simplify_subdivision

Global maximum subdivision level

Type int in [0, 32767], default 0

stamp_background

Color to use behind stamp text

Type float array of 4 items in [0, 1], default (0.0, 0.0, 0.0, 0.0)

stamp_font_size

Size of the font used when rendering stamp text

Type int in [8, 64], default 0

stamp_foreground

Color to use for stamp text

Type float array of 4 items in [0, 1], default (0.0, 0.0, 0.0, 0.0)

stamp_note_text

Custom text to appear in the stamp note

Type string, default ""

threads

Number of CPU threads to use simultaneously while rendering (for multi-core/CPU systems)

Type int in [1, 64], default 0

threads_mode

Determine the amount of render threads used

- AUTO** Auto-detect, Automatically determine the number of threads, based on CPUs.
- FIXED** Fixed, Manually determine the number of threads.

Type enum in ['AUTO', 'FIXED'], default 'AUTO'

use_antialiasing

Render and combine multiple samples per pixel to prevent jagged edges

Type boolean, default False

use_bake_antialiasing

Enables Anti-aliasing

Type boolean, default False

use_bake_clear

Clear Images before baking

Type boolean, default False

use_bake_lores_mesh

Calculate heights against unsubdivided low resolution mesh

Type boolean, default False

use_bake_multires

Bake directly from multires object

Type boolean, default False

use_bake_normalize

With displacement normalize to the distance, with ambient occlusion normalize without using material settings

Type boolean, default False

use_bake_selected_to_active

Bake shading on the surface of selected objects to the active object

Type boolean, default False

use_border

Render a user-defined border region, within the frame size (note that this disables save_buffers and full_sample)

Type boolean, default False

use_cineon_log

Convert to logarithmic color space

Type boolean, default False

use_color_management

Use linear workflow - gamma corrected imaging pipeline

Type boolean, default False

use_compositing

Process the render result through the compositing pipeline, if compositing nodes are enabled

Type boolean, default False

use_crop_to_border

Crop the rendered frame to the defined border size

Type boolean, default False

use_edge_enhance

Create a toon outline around the edges of geometry

Type boolean, default False

use_envmaps

Calculate environment maps while rendering

Type boolean, default False

use_fields

Render image to two fields per frame, for interlaced TV output

Type boolean, default False

use_fields_still

Disable the time difference between fields

Type boolean, default False

use_file_extension

Add the file format extensions to the rendered file name (eg: filename + .jpg)

Type boolean, default False

use_free_image_textures

Free all image texture from memory after render, to save memory before compositing

Type boolean, default False

use_free_unused_nodes

Free Nodes that are not used while compositing, to save memory

Type boolean, default False

use_full_sample

Save for every anti-aliasing sample the entire RenderLayer results (this solves anti-aliasing issues with compositing)

Type boolean, default False

use_game_engine

Current rendering engine is a game engine

Type boolean, default False, (readonly)

use_instances

Instance support leads to effective memory reduction when using duplicates

Type boolean, default False

use_local_coords

Vertex coordinates are stored locally on each primitive (increases memory usage, but may have impact on speed)

Type boolean, default False

use_motion_blur

Use multi-sampled 3D scene motion blur

Type boolean, default False

use_overwrite

Overwrite existing files while rendering

Type boolean, default False

use_placeholder

Create empty placeholder files while rendering frames (similar to Unix 'touch')

Type boolean, default False

use_radiosity

Calculate radiosity in a pre-process before rendering

Type boolean, default False

use_raytrace

Pre-calculate the raytrace accelerator and render raytracing effects

Type boolean, default False

use_save_buffers

Save tiles for all RenderLayers and SceneNodes to files in the temp directory (saves memory, required for Full Sample)

Type boolean, default False

use_sequencer

Process the render (and composited) result through the video sequence editor pipeline, if sequencer strips exist

Type boolean, default False

use_sequencer_gl_preview

Type boolean, default False

use_sequencer_gl_render

Type boolean, default False

use_shading_nodes

Active render engine uses new shading nodes system

Type boolean, default False, (readonly)

use_shadows

Calculate shadows while rendering

Type boolean, default False

use_simplify

Enable simplification of scene for quicker preview renders

Type boolean, default False

use_simplify_triangulate

Disables non-planer quads being triangulated

Type boolean, default False

use_single_layer

Only render the active layer

Type boolean, default False

use_sss

Calculate sub-surface scattering in materials rendering

Type boolean, default False

use_stamp

Render the stamp info text in the rendered image

Type boolean, default False

use_stamp_camera

Include the name of the active camera in image metadata

Type boolean, default False

use_stamp_date

Include the current date in image metadata

Type boolean, default False

use_stamp_filename

Include the .blend filename in image metadata

Type boolean, default False

use_stamp_frame

Include the frame number in image metadata

Type boolean, default False

use_stamp_lens

Include the active camera's lens in image metadata

Type boolean, default False

use_stamp_marker

Include the name of the last marker in image metadata

Type boolean, default False

use_stamp_note

Include a custom note in image metadata

Type boolean, default False

use_stamp_render_time

Include the render time in image metadata

Type boolean, default False

use_stamp_scene

Include the name of the active scene in image metadata

Type boolean, default False

use_stamp_sequencer_strip

Include the name of the foreground sequence strip in image metadata

Type boolean, default False

use_stamp_time

Include the rendered frame timecode as HH:MM:SS.FF in image metadata

Type boolean, default False

use_textures

Use textures to affect material properties

Type boolean, default False

use_tiff_16bit

Save TIFF with 16 bits per channel

Type boolean, default False

frame_path (*frame=-2147483648*)

Return the absolute path to the filename to be written for a given frame

Parameters **frame** (*int in [-inf, inf], (optional)*) – Frame number to use, if unset the current frame will be used

Returns File Path, The resulting filepath from the scenes render settings

Return type string

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.render`

2.4.479 RigidBodyJointConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.RigidBodyJointConstraint` (*Constraint*)

For use with the Game Engine

axis_x
Rotate pivot on X axis in degrees
Type float in [-6.28319, 6.28319], default 0.0

axis_y
Rotate pivot on Y axis in degrees
Type float in [-6.28319, 6.28319], default 0.0

axis_z
Rotate pivot on Z axis in degrees
Type float in [-6.28319, 6.28319], default 0.0

child
Child object
Type [Object](#)

limit_angle_max_x
Type float in [-6.28319, 6.28319], default 0.0

limit_angle_max_y
Type float in [-6.28319, 6.28319], default 0.0

limit_angle_max_z
Type float in [-6.28319, 6.28319], default 0.0

limit_angle_min_x
Type float in [-6.28319, 6.28319], default 0.0

limit_angle_min_y
Type float in [-6.28319, 6.28319], default 0.0

limit_angle_min_z
Type float in [-6.28319, 6.28319], default 0.0

limit_max_x
Type float in [-inf, inf], default 0.0

limit_max_y
Type float in [-inf, inf], default 0.0

limit_max_z
Type float in [-inf, inf], default 0.0

limit_min_x
Type float in [-inf, inf], default 0.0

limit_min_y
Type float in [-inf, inf], default 0.0

limit_min_z
Type float in [-inf, inf], default 0.0

pivot_type

- BALL** Ball, Allows rotations around all axes.
- HINGE** Hinge, Works in one plane, allows rotations around one axis only.
- CONE_TWIST** Cone Twist, Allows rotations around all axes with limits for the cone and twist axes.
- GENERIC_6_DOF** Generic 6 DoF, No constraints by default, limits can be set individually.

Type enum in ['BALL', 'HINGE', 'CONE_TWIST', 'GENERIC_6_DOF'], default 'BALL'

pivot_x

Offset pivot on X

Type float in [-1000, 1000], default 0.0

pivot_y

Offset pivot on Y

Type float in [-1000, 1000], default 0.0

pivot_z

Offset pivot on Z

Type float in [-1000, 1000], default 0.0

show_pivot

Display the pivot point and rotation in 3D view

Type boolean, default False

target

Target Object

Type *Object*

use_angular_limit_x

Use minimum/maximum x angular limit

Type boolean, default False

use_angular_limit_y

Use minimum/maximum y angular limit

Type boolean, default False

use_angular_limit_z

Use minimum/maximum z angular limit

Type boolean, default False

use_limit_x

Use minimum/maximum x limit

Type boolean, default False

use_limit_y

Use minimum/maximum y limit

Type boolean, default False

use_limit_z

Use minimum/maximum z limit

Type boolean, default False

use_linked_collision

Disable collision between linked bodies

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.480 SPHFluidSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SPHFluidSettings` (*bpy_struct*)

Settings for particle fluids physics

buoyancy

Artificial buoyancy force in negative gravity direction based on pressure differences inside the fluid

Type float in [0, 10], default 0.0

factor_density

Density is calculated as a factor of default density (depends on particle size)

Type boolean, default False

factor_radius

Interaction radius is a factor of 4 * particle size

Type boolean, default False

factor_repulsion

Repulsion is a factor of stiffness

Type boolean, default False

factor_rest_length

Spring rest length is a factor of 2 * particle size

Type boolean, default False

factor_stiff_viscosity

Stiff viscosity is a factor of normal viscosity

Type boolean, default False

fluid_radius

Fluid interaction radius

Type float in [0, 20], default 0.0

linear_viscosity

Linear viscosity

Type float in [0, 100], default 0.0

plasticity

How much the spring rest length can change after the elastic limit is crossed

Type float in [0, 100], default 0.0

repulsion

How strongly the fluid tries to keep from clustering (factor of stiffness)

Type float in [0, 100], default 0.0

rest_density

Fluid rest density

Type float in [0, 100], default 0.0

rest_length

Spring rest length (factor of particle radius)

Type float in [0, 2], default 0.0

spring_force

Spring force

Type float in [0, 100], default 0.0

spring_frames

Create springs for this number of frames since particles birth (0 is always)

Type int in [0, 100], default 0

stiff_viscosity

Creates viscosity for expanding fluid)

Type float in [0, 100], default 0.0

stiffness

How incompressible the fluid is

Type float in [0, 100], default 0.0

use_initial_rest_length

Use the initial length as spring rest length instead of 2 * particle size

Type boolean, default False

use_viscoelastic_springs

Use viscoelastic springs instead of Hooke's springs

Type boolean, default False

yield_ratio

How much the spring has to be stretched/compressed in order to change it's rest length

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ParticleSystem.fluid`

2.4.481 Scene(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Scene` (*ID*)

Scene data block, consisting in objects and defining time and render related settings

active_clip

Active movie clip used for constraints and viewport drawing

Type `MovieClip`

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

audio_distance_model

Distance model for distance attenuation calculation

- NONE None, No distance attenuation.
- INVERSE Inverse, Inverse distance model.
- INVERSE_CLAMPED Inverse Clamped, Inverse distance model with clamping.
- LINEAR Linear, Linear distance model.
- LINEAR_CLAMPED Linear Clamped, Linear distance model with clamping.
- EXPONENT Exponent, Exponent distance model.
- EXPONENT_CLAMPED Exponent Clamped, Exponent distance model with clamping.

Type enum in ['NONE', 'INVERSE', 'INVERSE_CLAMPED', 'LINEAR', 'LINEAR_CLAMPED', 'EXPONENT', 'EXPONENT_CLAMPED'], default 'NONE'

audio_doppler_factor

Pitch factor for Doppler effect calculation

Type float in [0, inf], default 0.0

audio_doppler_speed

Speed of sound for Doppler effect calculation

Type float in [0.01, inf], default 0.0

audio_volume

Audio volume

Type float in [0, 1], default 0.0

background_set

Background set scene

Type `Scene`

camera

Active camera, used for rendering the scene

Type `Object`

cursor_location

3D cursor location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Current Frame, to update animation data from python `frame_set()` instead

Type int in [-300000, 300000], default 0

frame_end

Final frame of the playback/rendering range

Type int in [0, 300000], default 0

frame_preview_end

Alternative end frame for UI playback

Type int in [-inf, inf], default 0

frame_preview_start

Alternative start frame for UI playback

Type int in [-inf, inf], default 0

frame_start

First frame of the playback/rendering range

Type int in [0, 300000], default 0

frame_step

Number of frames to skip forward while rendering/playing back each frame

Type int in [0, 300000], default 0

frame_subframe

Type float in [-inf, inf], default 0.0, (readonly)

game_settings

Type `SceneGameData`, (readonly, never None)

gravity

Constant acceleration in a given direction

Type float array of 3 items in [-200, 200], default (0.0, 0.0, 0.0)

grease_pencil

Grease Pencil datablock

Type `GreasePencil`

is_nla_tweakmode

Whether there is any action referenced by NLA being edited (strictly read-only)

Type boolean, default False, (readonly)

keying_sets

Absolute Keying Sets for this Scene

Type `KeyingSets` bpy_prop_collection of `KeyingSet`, (readonly)

keying_sets_all

All Keying Sets available for use (Builtins and Absolute Keying Sets for this Scene)

Type `KeyingSetsAll` bpy_prop_collection of `KeyingSet`, (readonly)

layers

Layers visible when rendering the scene

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

node_tree

Compositing node tree

Type `NodeTree`, (readonly)

object_bases

Type `SceneBases` `bpy_prop_collection` of `ObjectBase`, (readonly)

objects

Type `SceneObjects` `bpy_prop_collection` of `Object`, (readonly)

orientations

Type `bpy_prop_collection` of `TransformOrientation`, (readonly)

render

Type `RenderSettings`, (readonly, never None)

sequence_editor

Type `SequenceEditor`, (readonly)

sync_mode

How to sync playback

- NONE No Sync, Do not sync, play every frame.
- FRAME_DROP Frame Dropping, Drop frames if playback is too slow.
- AUDIO_SYNC AV-sync, Sync to audio playback, dropping frames.

Type enum in ['NONE', 'FRAME_DROP', 'AUDIO_SYNC'], default 'NONE'

timeline_markers

Markers used in all timelines for the current scene

Type `TimelineMarkers` `bpy_prop_collection` of `TimelineMarker`, (readonly)

tool_settings

Type `ToolSettings`, (readonly, never None)

unit_settings

Unit editing settings

Type `UnitSettings`, (readonly, never None)

use_audio

Play back of audio from Sequence Editor will be muted

Type boolean, default False

use_audio_scrub

Play audio from Sequence Editor while scrubbing

Type boolean, default False

use_audio_sync

Play back and sync with audio clock, dropping frames if frame display is too slow

Type boolean, default False

use_frame_drop

Play back dropping frames if frame display is too slow

Type boolean, default False

use_gravity

Use global gravity for all dynamics

Type boolean, default False

use_nodes

Enable the compositing node tree

Type boolean, default False

use_preview_range

Use an alternative start/end frame for UI playback, rather than the scene start/end frame

Type boolean, default False

use_stamp_note

User defined note for the render stamping

Type string, default ""

world

World used for rendering the scene

Type `World`

statistics ()

statistics

Returns Statistics

Return type string

frame_set (*frame*, *subframe=0.0*)

Set scene frame updating all objects immediately

Parameters

- **frame** (*int in [-300000, 300000]*) – Frame number to set
- **subframe** (*float in [0, 1], (optional)*) – Sub-frame time, between 0.0 and 1.0

update ()

Update data tagged to be updated from previous access to data or operators

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.scenes`
- `BlendDataScenes.new`
- `BlendDataScenes.remove`
- `Camera.view_frame`
- `CompositorNodeRLayers.scene`
- `Context.scene`
- `EnvironmentMap.save`
- `Image.save_render`
- `Object.dupli_list_create`
- `Object.is_modified`
- `Object.is_visible`
- `Object.to_mesh`
- `RenderEngine.render`
- `RenderEngine.update`
- `Scene.background_set`
- `SceneActuator.scene`
- `SceneSequence.scene`
- `Screen.scene`

2.4.482 SceneActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.SceneActuator` (*Actuator*)

camera

Set this Camera (leave empty to refer to self object)

Type `Object`

mode

Type `enum` in ['RESTART', 'SET', 'CAMERA', 'ADDFRONT', 'ADDBACK', 'REMOVE', 'SUSPEND', 'RESUME'], default 'RESTART'

scene

Scene to be added/removed/paused/resumed

Type Scene

Inherited Properties

- bpy_struct.id_data
- Actuator.name
- Actuator.show_expanded
- Actuator.pin
- Actuator.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values
- Actuator.link
- Actuator.unlink

2.4.483 SceneBases(bpy_struct)

base class — bpy_struct

class bpy.types.**SceneBases** (*bpy_struct*)

Collection of scene bases

active

Active object base in the scene

Type ObjectBase

Inherited Properties

- bpy_struct.id_data

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.object_bases`

2.4.484 SceneGameData(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SceneGameData` (*bpy_struct*)

Game data for a Scene datablock

activity_culling_box_radius

Radius of the activity bubble, in Manhattan length (objects outside the box are activity-culled)

Type float in [0, 1000], default 0.0

depth

Display bit depth of full screen display

Type int in [8, 32], default 0

dome_angle

Field of View of the Dome - it only works in mode Fisheye and Truncated

Type int in [-32768, 32767], default 0

dome_buffer_resolution

Buffer Resolution - decrease it to increase speed

Type float in [-inf, inf], default 0.0

dome_mode

Dome physical configurations

Type enum in ['FISHEYE', 'TRUNCATED_FRONT', 'TRUNCATED_REAR', 'ENVMAP', 'PANORAM_SPH'], default 'FISHEYE'

dome_tessellation

Tessellation level - check the generated mesh in wireframe mode

Type int in [-32768, 32767], default 0

dome_text

Custom Warp Mesh data file

Type Text

dome_tilt

Camera rotation in horizontal axis

Type int in [-32768, 32767], default 0

fps

Nominal number of game frames per second (physics fixed timestep = 1/fps, independently of actual frame rate)

Type int in [1, 250], default 0

frame_color

Set color of the bars

Type float array of 3 items in [0, 1], default (0.0, 0.0, 0.0)

frame_type

Select the type of Framing you want

- LETTERBOX Letterbox, Show the entire viewport in the display window, using bar horizontally or vertically.
- EXTEND Extend, Show the entire viewport in the display window, viewing more horizontally or vertically.
- SCALE Scale, Stretch or squeeze the viewport to fill the display window.

Type enum in ['LETTERBOX', 'EXTEND', 'SCALE'], default 'LETTERBOX'

frequency

Display clock frequency of fullscreen display

Type int in [4, 2000], default 0

level_height

Max difference in heights of obstacles to enable their interaction

Type float in [0, 200], default 0.0

logic_step_max

Maximum number of logic frame per game frame if graphics slows down the game, higher value allows better synchronization with physics

Type int in [1, 5], default 0

material_mode

Material mode to use for rendering

- SINGLETEXTURE Singletexture, Singletexture face materials.
- MULTITEXTURE Multitexture, Multitexture materials.
- GLSL GLSL, OpenGL shading language shaders.

Type enum in ['SINGLETEXTURE', 'MULTITEXTURE', 'GLSL'], default 'SINGLETEXTURE'

obstacle_simulation

Simulation used for obstacle avoidance in the game engine

Type enum in ['NONE', 'RVO_RAYS', 'RVO_CELLS'], default 'NONE'

occlusion_culling_resolution

Size of the occlusion buffer in pixel, use higher value for better precision (slower)

Type int in [128, 1024], default 0

physics_engine

Physics engine used for physics simulation in the game engine

- NONE None, Don't use a physics engine.
- BULLET Bullet, Use the Bullet physics engine.

Type enum in ['NONE', 'BULLET'], default 'NONE'

physics_gravity

Gravitational constant used for physics simulation in the game engine

Type float in [0, 10000], default 0.0

physics_step_max

Maximum number of physics step per game frame if graphics slows down the game, higher value allows physics to keep up with realtime

Type int in [1, 5], default 0

physics_step_sub

Number of simulation substep per physic timestep, higher value give better physics precision

Type int in [1, 5], default 0

recast_data

Type `SceneGameRecastData`, (readonly, never None)

resolution_x

Number of horizontal pixels in the screen

Type int in [4, 10000], default 0

resolution_y

Number of vertical pixels in the screen

Type int in [4, 10000], default 0

restrict_animation_updates

Restrict the number of animation updates to the animation FPS (this is better for performance, but can cause issues with smooth playback)

Type boolean, default False

show_debug_properties

Show properties marked for debugging while the game runs

Type boolean, default False

show_framerate_profile

Show framerate and profiling information while the game runs

Type boolean, default False

show_fullscreen

Start player in a new fullscreen display

Type boolean, default False

show_mouse

Start player with a visible mouse cursor

Type boolean, default False

show_obstacle_simulation

Enable debug visualization for obstacle simulation

Type boolean, default False

show_physics_visualization

Show a visualization of physics bounds and interactions

Type boolean, default False

stereo

- NONE None, Disable Stereo and Dome environments.
- STEREO Stereo, Enable Stereo environment.
- DOME Dome, Enable Dome environment.

Type enum in ['NONE', 'STEREO', 'DOME'], default 'NONE'

stereo_eye_separation

Set the distance between the eyes - the camera focal length/30 should be fine

Type float in [0.01, 5], default 0.0

stereo_mode

Stereographic techniques

Type enum in ['QUADBUFFERED', 'ABOVEBELOW', 'INTERLACED', 'ANAGLYPH', 'SIDEBYSIDE', 'VINTERLACE'], default 'QUADBUFFERED'

use_activity_culling

Activity culling is enabled

Type boolean, default False

use_animation_record

Record animation to F-Curves

Type boolean, default False

use_auto_start

Automatically start game at load time

Type boolean, default False

use_deprecation_warnings

Print warnings when using deprecated features in the python API

Type boolean, default False

use_display_lists

Use display lists to speed up rendering by keeping geometry on the GPU

Type boolean, default False

use_frame_rate

Respect the frame rate rather than rendering as many frames as possible

Type boolean, default False

use_gls1_color_management

Use color management for GLSL rendering

Type boolean, default False

use_gls1_extra_textures

Use extra textures like normal or specular maps for GLSL rendering

Type boolean, default False

use_gls1_lights

Use lights for GLSL rendering

Type boolean, default False

use_gls1_nodes

Use nodes for GLSL rendering

Type boolean, default False

use_gls1_ramps

Use ramps for GLSL rendering

Type boolean, default False

use_gls1_shaders

Use shaders for GLSL rendering

Type boolean, default False

use_gls1_shadows

Use shadows for GLSL rendering

Type boolean, default False

use_occlusion_culling

Use optimized Bullet DBVT tree for view frustum and occlusion culling

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.game_settings`

2.4.485 SceneGameRecastData(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SceneGameRecastData` (*`bpy_struct`*)

Recast data for a Game datablock

agent_height

Minimum height where the agent can still walk

Type float in [-inf, inf], default 0.0

agent_radius

Radius of the agent

Type float in [-inf, inf], default 0.0

cell_height

Rasterized cell height

Type float in [-inf, inf], default 0.0

cell_size

Rasterized cell size

Type float in [-inf, inf], default 0.0

climb_max

Maximum height between grid cells the agent can climb

Type float in [-inf, inf], default 0.0

edge_max_error

Maximum distance error from contour to cells

Type float in [-inf, inf], default 0.0

edge_max_len

Maximum contour edge length

Type float in [-inf, inf], default 0.0

region_merge_size

Minimum regions size (smaller regions will be merged)

Type float in [-inf, inf], default 0.0

region_min_size

Minimum regions size (smaller regions will be deleted)

Type float in [-inf, inf], default 0.0

sample_dist

Detail mesh sample spacing

Type float in [-inf, inf], default 0.0**sample_max_error**

Detail mesh simplification max sample error

Type float in [-inf, inf], default 0.0**slope_max**

Maximum walkable slope angle in degrees

Type float in [0, 1.5708], default 0.0**verts_per_poly**

Max number of vertices per polygon

Type int in [-inf, inf], default 0**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SceneGameData.recast_data`

2.4.486 SceneObjects(`bpy_struct`)base class — `bpy_struct`

class `bpy.types.SceneObjects` (*bpy_struct*)
Collection of scene objects

active

Active object for this scene

Type `Object`

link (*object*)

Link object to scene, run scene.update() after

Parameters **object** (`Object`, (never None)) – Object to add to scene

Returns The newly created base

Return type `ObjectBase`

unlink (*object*)

Unlink object from scene

Parameters **object** (`Object`, (never None)) – Object to remove from scene

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.objects`

2.4.487 SceneRenderLayer(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SceneRenderLayer` (*bpy_struct*)

Render layer

exclude_ambient_occlusion

Exclude AO pass from combined

Type boolean, default False

exclude_emit

Exclude emission pass from combined

Type boolean, default False

exclude_environment

Exclude environment pass from combined

Type boolean, default False

exclude_indirect

Exclude indirect pass from combined

Type boolean, default False

exclude_reflection

Exclude raytraced reflection pass from combined

Type boolean, default False

exclude_refraction

Exclude raytraced refraction pass from combined

Type boolean, default False

exclude_shadow

Exclude shadow pass from combined

Type boolean, default False

exclude_specular

Exclude specular pass from combined

Type boolean, default False

invert_zmask

For Zmask, only render what is behind solid z values instead of in front

Type boolean, default False

layers

Scene layers included in this render layer

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

layers_zmask

Zmask scene layers for solid faces

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

light_override

Group to override all other lights in this render layer

Type [Group](#)

material_override

Material to override all other materials in this render layer

Type [Material](#)

name

Render layer name

Type string, default ""

use

Disable or enable the render layer

Type boolean, default False

use_all_z

Fill in Z values for solid faces in invisible layers, for masking

Type boolean, default False

use_edge_enhance

Render Edge-enhance in this Layer (only works for Solid faces)

Type boolean, default False

use_halo

Render Halos in this Layer (on top of Solid)

Type boolean, default False

use_pass_ambient_occlusion

Deliver AO pass

Type boolean, default False

use_pass_color

Deliver shade-less color pass

Type boolean, default False

use_pass_combined

Deliver full combined RGBA buffer

Type boolean, default False

use_pass_diffuse

Deliver diffuse pass

Type boolean, default False

use_pass_emit

Deliver emission pass

Type boolean, default False

use_pass_environment

Deliver environment lighting pass

Type boolean, default False

use_pass_indirect

Deliver indirect lighting pass

Type boolean, default False

use_pass_material_index

Deliver material index pass

Type boolean, default False

use_pass_mist

Deliver mist factor pass (0.0-1.0)

Type boolean, default False

- use_pass_normal**
Deliver normal pass
Type boolean, default False
- use_pass_object_index**
Deliver object index pass
Type boolean, default False
- use_pass_reflection**
Deliver raytraced reflection pass
Type boolean, default False
- use_pass_refraction**
Deliver raytraced refraction pass
Type boolean, default False
- use_pass_shadow**
Deliver shadow pass
Type boolean, default False
- use_pass_specular**
Deliver specular pass
Type boolean, default False
- use_pass_uv**
Deliver texture UV pass
Type boolean, default False
- use_pass_vector**
Deliver speed vector pass
Type boolean, default False
- use_pass_z**
Deliver Z values pass
Type boolean, default False
- use_sky**
Render Sky in this Layer
Type boolean, default False
- use_solid**
Render Solid faces in this Layer
Type boolean, default False
- use_strand**
Render Strands in this Layer
Type boolean, default False
- use_zmask**
Only render what's in front of the solid z values
Type boolean, default False
- use_ztransp**
Render Z-Transparent faces in this Layer (on top of Solid and Halos)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `RenderLayers.active`
- `RenderLayers.new`
- `RenderLayers.remove`
- `RenderSettings.layers`

2.4.488 SceneSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

class `bpy.types.SceneSequence` (*Sequence*)
Sequence strip to used the rendered image of a scene

animation_offset_end
Animation end offset (trim end)

Type int in [0, inf], default 0

animation_offset_start
Animation start offset (trim start)

Type int in [0, inf], default 0

color_balance
Type `SequenceColorBalance`, (readonly)

color_multiply

Type float in [0, 20], default 0.0

color_saturation

Type float in [0, 20], default 0.0

crop

Type `SequenceCrop`, (readonly)

proxy

Type `SequenceProxy`, (readonly)

scene

Scene that this sequence uses

Type `Scene`

scene_camera

Override the scenes active camera

Type `Object`

strobe

Only display every nth frame

Type float in [1, 30], default 0.0

transform

Type `SequenceTransform`, (readonly)

use_color_balance

(3-Way color correction) on input

Type boolean, default False

use_crop

Crop image before processing

Type boolean, default False

use_deinterlace

For video movies to remove fields

Type boolean, default False

use_flip_x

Flip on the X axis

Type boolean, default False

use_flip_y

Flip on the Y axis

Type boolean, default False

use_float

Convert input to float data

Type boolean, default False

use_premultiply

Convert RGB from key alpha to premultiplied alpha

Type boolean, default False

use_proxy

Use a preview proxy and/or timecode index for this strip

Type boolean, default False

use_proxy_custom_directory

Use a custom directory to store data

Type boolean, default False

use_proxy_custom_file

Use a custom file to read proxy data from

Type boolean, default False

use_reverse_frames

Reverse frame order

Type boolean, default False

use_translation

Translate image before processing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.489 `Scopes(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.Scopes` (*bpy_struct*)

Scopes for statistical view of an image

accuracy

Proportion of original image source pixel lines to sample

Type float in [0, 100], default 0.0

histogram

Histogram for viewing image statistics

Type `Histogram`, (readonly)

use_full_resolution

Sample every pixel of the image

Type boolean, default False

vectorscope_alpha

Opacity of the points

Type float in [0, 1], default 0.0

waveform_alpha

Opacity of the points

Type float in [0, 1], default 0.0

waveform_mode

Type enum in ['LUMA', 'RGB', 'YCBCR601', 'YCBCR709', 'YCBCRJPG'], default 'LUMA'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceImageEditor.scopes`

2.4.490 Screen(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Screen` (*ID*)

Screen datablock, defining the layout of areas in a window

areas

Areas the screen is subdivided into

Type `bpy_prop_collection` of `Area`, (readonly)

is_animation_playing

Animation playback is active

Type `boolean`, default `False`, (readonly)

scene

Active scene to be edited in the screen

Type `Scene`, (never `None`)

show_fullscreen

An area is maximised, filling this screen

Type `boolean`, default `False`, (readonly)

use_play_3d_editors

Type boolean, default False

use_play_animation_editors

Type boolean, default False

use_play_clip_editors

Type boolean, default False

use_play_image_editors

Type boolean, default False

use_play_node_editors

Type boolean, default False

use_play_properties_editors

Type boolean, default False

use_play_sequence_editors

Type boolean, default False

use_play_top_left_3d_editor

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.screens`
- `Context.screen`
- `Window.screen`

2.4.491 ScrewModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ScrewModifier` (*Modifier*)
Revolve edges

angle

Angle of revolution

Type float in [-inf, inf], default 0.0

axis

Screw axis

Type enum in ['X', 'Y', 'Z'], default 'X'

iterations

Number of times to apply the screw operation

Type int in [1, 10000], default 0

object

Object to define the screw axis

Type `Object`

render_steps

Number of steps in the revolution

Type int in [2, 10000], default 0

screw_offset

Offset the revolution along its axis

Type float in [-inf, inf], default 0.0

steps

Number of steps in the revolution

Type int in [2, 10000], default 0

use_normal_calculate

Calculate the order of edges (needed for meshes, but not curves)

Type boolean, default False

use_normal_flip

Flip normals of lathed faces

Type boolean, default False

use_object_screw_offset

Use the distance between the objects to make a screw

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.492 Sculpt(Paint)

base classes — `bpy_struct`, `Paint`

class `bpy.types.Sculpt` (*Paint*)

lock_x

Disallow changes to the X axis of vertices

Type boolean, default False

lock_y

Disallow changes to the Y axis of vertices

Type boolean, default False

lock_z

Disallow changes to the Z axis of vertices

Type boolean, default False

radial_symmetry

Number of times to copy strokes across the surface

Type int array of 3 items in [1, 64], default (1, 1, 1)

use_deform_only

Use only deformation modifiers (temporary disable all constructive modifiers except multi-resolution)

Type boolean, default False

use_symmetry_feather

Reduce the strength of the brush where it overlaps symmetrical daubs

Type boolean, default False

use_symmetry_x

Mirror brush across the X axis

Type boolean, default False

use_symmetry_y

Mirror brush across the Y axis

Type boolean, default False

use_symmetry_z

Mirror brush across the Z axis

Type boolean, default False

use_threaded

Take advantage of multiple CPU cores to improve sculpting performance

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Paint.brush`
- `Paint.show_low_resolution`
- `Paint.show_brush`
- `Paint.show_brush_on_surface`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ToolSettings.sculpt`

2.4.493 Sensor(`bpy_struct`)

base class — `bpy_struct`

subclasses — `RaySensor`, `PropertySensor`, `MessageSensor`, `TouchSensor`, `KeyboardSensor`, `CollisionSensor`, `RadarSensor`, `DelaySensor`, `RandomSensor`, `AlwaysSensor`, `ActuatorSensor`, `JoystickSensor`, `MouseSensor`, `ArmatureSensor`, `NearSensor`

class `bpy.types.Sensor` (*`bpy_struct`*)

Game engine logic brick to detect events

frequency

Delay between repeated pulses(in logic tics, 0=no delay)

Type int in [0, 10000], default 0

invert

Invert the level(output) of this sensor

Type boolean, default False

name

Sensor name

Type string, default ""

pin

Display when not linked to a visible states controller

Type boolean, default False

show_expanded

Set sensor expanded in the user interface

Type boolean, default False

type

Type enum in ['ACTUATOR', 'ALWAYS', 'ARMATURE', 'COLLISION', 'DELAY', 'JOY-STICK', 'KEYBOARD', 'MESSAGE', 'MOUSE', 'NEAR', 'PROPERTY', 'RADAR', 'RANDOM', 'RAY', 'TOUCH'], default 'ALWAYS'

use_level

Level detector, trigger controllers of new states(only applicable upon logic state transition)

Type boolean, default False

use_pulse_false_level

Activate FALSE level triggering (pulse mode)

Type boolean, default False

use_pulse_true_level

Activate TRUE level triggering (pulse mode)

Type boolean, default False

use_tap

Trigger controllers only for an instant, even while the sensor remains true

Type boolean, default False

link (*controller*)

Link the sensor to a controller

Parameters **controller** (*Controller*) – Controller to link to

unlink (*controller*)

Unlink the sensor from a controller

Parameters **controller** (*Controller*) – Controller to unlink from

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Controller.link`
- `Controller.unlink`
- `GameObjectSettings.sensors`

2.4.494 Sequence(`bpy_struct`)

base class — `bpy_struct`

subclasses — [MulticamSequence](#), [ImageSequence](#), [SceneSequence](#), [AdjustmentSequence](#), [MetaSequence](#), [SoundSequence](#), [MovieSequence](#), [EffectSequence](#)

class `bpy.types.Sequence` (*bpy_struct*)

Sequence strip in the sequence editor

blend_alpha

Type float in [0, 1], default 0.0

blend_type

Type enum in ['REPLACE', 'CROSS', 'ADD', 'SUBTRACT', 'ALPHA_OVER', 'ALPHA_UNDER', 'GAMMA_CROSS', 'MULTIPLY', 'OVER_DROP'], default 'REPLACE'

channel

Y position of the sequence strip

Type int in [0, 31], default 0

effect_fader

Type float in [0, 1], default 0.0

frame_duration

The length of the contents of this strip before the handles are applied

Type int in [1, 300000], default 0, (readonly)

frame_final_duration

The length of the contents of this strip after the handles are applied

Type int in [1, 300000], default 0

frame_final_end

End frame displayed in the sequence editor after offsets are applied

Type int in [-inf, inf], default 0

frame_final_start

Start frame displayed in the sequence editor after offsets are applied, setting this is equivalent to moving the handle, not the actual start frame

Type int in [-inf, inf], default 0

frame_offset_end

Type int in [-inf, inf], default 0, (readonly)

frame_offset_start

Type int in [-inf, inf], default 0, (readonly)

frame_start

Type int in [-inf, inf], default 0

frame_still_end

Type int in [0, 300000], default 0, (readonly)

frame_still_start

Type int in [0, 300000], default 0, (readonly)

input_1

First input for the effect strip

Type `Sequence`, (readonly)

input_2
Second input for the effect strip

Type `Sequence`, (readonly)

input_3
Third input for the effect strip

Type `Sequence`, (readonly)

input_count
Type `int` in `[0, inf]`, default `0`, (readonly)

lock
Lock strip so that it can't be transformed

Type `boolean`, default `False`

mute
Type `boolean`, default `False`

name
Type `string`, default `""`

select
Type `boolean`, default `False`

select_left_handle
Type `boolean`, default `False`

select_right_handle
Type `boolean`, default `False`

speed_factor
Multiply the current speed of the sequence with this number or remap current frame to this frame

Type `float` in `[-inf, inf]`, default `0.0`

type
Type `enum` in `['IMAGE', 'META', 'SCENE', 'MOVIE', 'SOUND', 'CROSS', 'ADD', 'SUBTRACT', 'ALPHA_OVER', 'ALPHA_UNDER', 'GAMMA_CROSS', 'MULTIPLY', 'OVER_DROP', 'PLUGIN', 'WIPE', 'GLOW', 'TRANSFORM', 'COLOR', 'SPEED', 'MULTICAM', 'ADJUSTMENT']`, default `'IMAGE'`, (readonly)

use_default_fade
Fade effect using the built-in default (usually make transition as long as effect strip)

Type `boolean`, default `False`

waveform
Whether to draw the sound's waveform

Type `boolean`, default `False`

getStripElem (*frame*)
Return the strip element from a given frame or None

Parameters **frame** (*int* in `[-300000, 300000]`) – Frame, The frame to get the strip element from

Returns strip element of the current frame

Return type `SequenceElement`

swap (*other*)

swap

Parameters **other** (`Sequence`, (never `None`)) – Other

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `MetaSequence.sequences`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.swap`
- `SequenceEditor.active_strip`
- `SequenceEditor.meta_stack`
- `SequenceEditor.sequences`
- `SequenceEditor.sequences_all`

2.4.495 SequenceColorBalance(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SequenceColorBalance` (*bpy_struct*)

Color balance parameters for a sequence strip

gain

Color balance gain (highlights)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

gamma

Color balance gamma (midtones)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

invert_gain

Type boolean, default False

invert_gamma

Type boolean, default False

invert_lift

Type boolean, default False

lift

Color balance lift (shadows)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AdjustmentSequence.color_balance`
- `EffectSequence.color_balance`
- `ImageSequence.color_balance`
- `MetaSequence.color_balance`
- `MovieSequence.color_balance`
- `MulticamSequence.color_balance`
- `SceneSequence.color_balance`

2.4.496 SequenceCrop(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SequenceCrop` (*bpy_struct*)

Cropping parameters for a sequence strip

max_x

Type int in [0, inf], default 0

max_y

Type int in [0, inf], default 0

min_x

Type int in [0, inf], default 0

min_y

Type int in [0, inf], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AdjustmentSequence.crop`
- `EffectSequence.crop`
- `ImageSequence.crop`
- `MetaSequence.crop`
- `MovieSequence.crop`
- `MulticamSequence.crop`
- `SceneSequence.crop`

2.4.497 SequenceEditor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SequenceEditor` (*bpy_struct*)

Sequence editing data for a Scene datablock

active_strip

Type `Sequence`

meta_stack

Meta strip stack, last is currently edited meta strip

Type `bpy_prop_collection` of `Sequence`, (readonly)

overlay_frame

Sequencer's active strip

Type `int` in `[-inf, inf]`, default 0

overlay_lock

Type `boolean`, default `False`

sequences

Type `bpy_prop_collection` of `Sequence`, (readonly)

sequences_all

Type `bpy_prop_collection` of `Sequence`, (readonly)

show_overlay

Partial overlay on top of the sequencer

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.sequence_editor`

2.4.498 SequenceElement(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SequenceElement` (*bpy_struct*)
Sequence strip data for a single frame

filename

Type string, default ""

orig_height

Original image height

Type int in [-inf, inf], default 0, (readonly)

orig_width

Original image width

Type int in [-inf, inf], default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ImageSequence.elements`
- `MovieSequence.elements`
- `Sequence.getStripElem`

2.4.499 SequenceProxy(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SequenceProxy` (*bpy_struct*)

Proxy parameters for a sequence strip

build_100

Build 100% proxy resolution

Type boolean, default False

build_25

Build 25% proxy resolution

Type boolean, default False

build_50

Build 50% proxy resolution

Type boolean, default False

build_75

Build 75% proxy resolution

Type boolean, default False

build_free_run

Build free run time code index

Type boolean, default False

build_free_run_rec_date

Build free run time code index using Record Date/Time

Type boolean, default False

build_record_run

Build record run time code index

Type boolean, default False

directory

Location to store the proxy files

Type string, default ""

filepath

Location of custom proxy file

Type string, default ""

quality

JPEG Quality of proxies to build

Type int in [0, 32767], default 0

timecode

- NONE No TC in use.
- RECORD_RUN Record Run, Use images in the order as they are recorded.
- FREE_RUN Free Run, Use global timestamp written by recording device.
- FREE_RUN_REC_DATE Free Run (rec date), Interpolate a global timestamp using the record date and time written by recording device.

Type enum in ['NONE', 'RECORD_RUN', 'FREE_RUN', 'FREE_RUN_REC_DATE'], default 'NONE'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AdjustmentSequence.proxy`
- `EffectSequence.proxy`
- `ImageSequence.proxy`
- `MetaSequence.proxy`
- `MovieSequence.proxy`
- `MulticamSequence.proxy`
- `SceneSequence.proxy`

2.4.500 SequenceTransform(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SequenceTransform` (*bpy_struct*)

Transform parameters for a sequence strip

offset_x

Type int in [-inf, inf], default 0

offset_y

Type int in [-inf, inf], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `AdjustmentSequence.transform`
- `EffectSequence.transform`
- `ImageSequence.transform`
- `MetaSequence.transform`
- `MovieSequence.transform`
- `MulticamSequence.transform`
- `SceneSequence.transform`

2.4.501 ShaderNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `ShaderNodeBsdfDiffuse`, `ShaderNodeHueSaturation`, `ShaderNodeTexWave`,
`ShaderNodeBsdfTranslucent`, `ShaderNodeVectorMath`, `ShaderNodeMixShader`,
`ShaderNodeRGB`, `ShaderNodeCameraData`, `ShaderNodeTexEnvironment`,
`ShaderNodeMath`, `ShaderNodeTexGradient`, `ShaderNodeRGBToBW`, `ShaderNodeTexCoord`,
`ShaderNodeTexImage`, `ShaderNodeTexMusgrave`, `ShaderNodeBsdfTransparent`,
`ShaderNodeHoldout`, `ShaderNodeOutputWorld`, `ShaderNodeRGBCurve`,
`ShaderNodeVolumeTransparent`, `ShaderNodeInvert`, `ShaderNodeTexSky`,
`ShaderNodeBsdfVelvet`, `ShaderNodeExtendedMaterial`, `ShaderNodeMaterial`,
`ShaderNodeBsdfGlass`, `ShaderNodeAddShader`, `ShaderNodeBackground`,
`ShaderNodeEmission`, `ShaderNodeValue`, `ShaderNodeMixRGB`, `ShaderNodeSeparateRGB`,
`ShaderNodeVectorCurve`, `ShaderNodeLayerWeight`, `ShaderNodeNewGeometry`,
`ShaderNodeCombineRGB`, `ShaderNodeAttribute`, `ShaderNodeTexNoise`, `ShaderNodeFresnel`,
`ShaderNodeOutputLamp`, `ShaderNodeOutput`, `ShaderNodeValToRGB`, `ShaderNodeGeometry`,
`ShaderNodeTexture`, `ShaderNodeTexMagic`, `ShaderNodeOutputMaterial`,

ShaderNodeMapping, ShaderNodeSqueeze, ShaderNodeTexVoronoi, ShaderNodeBsdGlossy, ShaderNodeLight_path, ShaderNodeVolumeIsotropic, ShaderNodeNormal

class bpy.types.**ShaderNode** (*Node*)

Material shader node

type

Type enum in ['OUTPUT', 'MATERIAL', 'RGB', 'VALUE', 'MIX_RGB', 'VALTORGB', 'RGBTOBW', 'TEXTURE', 'NORMAL', 'GEOMETRY', 'MAPPING', 'CURVE_VEC', 'CURVE_RGB', 'CAMERA', 'MATH', 'VECT_MATH', 'SQUEEZE', 'MATERIAL_EXT', 'INVERT', 'SEPRGB', 'COMBRGB', 'HUE_SAT', 'OUTPUT_MATERIAL', 'OUTPUT_WORLD', 'OUTPUT_LAMP', 'FRESNEL', 'MIX_SHADER', 'ATTRIBUTE', 'BACKGROUND', 'BSDF_DIFFUSE', 'BSDF_GLOSSY', 'BSDF_GLASS', 'BSDF_TRANSLUCENT', 'BSDF_TRANSPARENT', 'BSDF_VELVET', 'EMISSION', 'NEW_GEOMETRY', 'LIGHT_PATH', 'TEX_IMAGE', 'TEX_SKY', 'TEX_GRADIENT', 'TEX_VORONOI', 'TEX_MAGIC', 'TEX_WAVE', 'TEX_NOISE', 'TEX_MUSGRAVE', 'TEX_COORD', 'ADD_SHADER', 'TEX_ENVIRONMENT', 'HOLDOUT', 'LAYER_WEIGHT', 'VOLUME_TRANSPARENT', 'VOLUME_ISOTROPIC', 'SCRIPT', 'GROUP'], default 'OUTPUT', (readonly)

Inherited Properties

- bpy_struct.id_data
- Node.name
- Node.inputs
- Node.label
- Node.location
- Node.outputs
- Node.parent
- Node.show_texture

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.502 ShaderNodeAddShader(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeAddShader` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.503 ShaderNodeAttribute(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeAttribute` (*ShaderNode*)

attribute_name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`

- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.504 ShaderNodeBackground(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBackground` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.505 ShaderNodeBsdiffuse(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdiffuse` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.506 ShaderNodeBsdfGlass(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdfGlass` (*ShaderNode*)

distribution

Type enum in ['SHARP', 'BECKMANN', 'GGX'], default 'BECKMANN'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.507 ShaderNodeBsdfGlossy(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdfGlossy` (*ShaderNode*)

distribution

Type enum in ['SHARP', 'BECKMANN', 'GGX'], default 'BECKMANN'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.508 ShaderNodeBsdfTranslucent(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdfTranslucent` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.509 ShaderNodeBsdFTransparent(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdFTransparent` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.510 ShaderNodeBsdVelvet(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeBsdVelvet` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.511 ShaderNodeCameraData(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeCameraData` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`

- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.512 ShaderNodeCombineRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeCombineRGB` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.513 ShaderNodeEmission(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeEmission` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.514 ShaderNodeExtendedMaterial(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeExtendedMaterial` (*ShaderNode*)

invert_normal

Material Node uses inverted normal

Type boolean, default False

material

Type `Material`

use_diffuse

Material Node outputs Diffuse

Type boolean, default False

use_specular

Material Node outputs Specular

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.515 ShaderNodeFresnel(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeFresnel` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.516 ShaderNodeGeometry(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeGeometry` (*ShaderNode*)

color_layer

Type string, default ""

uv_layer

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.517 ShaderNodeHoldout(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeHoldout` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.518 ShaderNodeHueSaturation(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeHueSaturation` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.519 ShaderNodeInvert(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeInvert` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.520 ShaderNodeLayerWeight(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeLayerWeight` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`

- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.521 ShaderNodeLight_path(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeLight_path` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.522 ShaderNodeMapping(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeMapping` (*ShaderNode*)

location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

max

Maximum value for clipping

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

min

Minimum value for clipping

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

rotation

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scale

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

use_max

Whether to use maximum clipping value

Type boolean, default False

use_min

Whether to use minimum clipping value

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`

- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.523 ShaderNodeMaterial(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeMaterial` (*ShaderNode*)

invert_normal

Material Node uses inverted normal

Type boolean, default False

material

Type `Material`

use_diffuse

Material Node outputs Diffuse

Type boolean, default False

use_specular

Material Node outputs Specular

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`

- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.524 ShaderNodeMath(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeMath` (*ShaderNode*)

operation

Type enum in ['ADD', 'SUBTRACT', 'MULTIPLY', 'DIVIDE', 'SINE', 'COSINE', 'TANGENT', 'ARCSINE', 'ARCCOSINE', 'ARCTANGENT', 'POWER', 'LOGARITHM', 'MINIMUM', 'MAXIMUM', 'ROUND', 'LESS_THAN', 'GREATER_THAN'], default 'ADD'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.525 ShaderNodeMixRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeMixRGB` (*ShaderNode*)

blend_type

Type enum in ['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

use_alpha

Include alpha of second input in this operation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.526 ShaderNodeMixShader(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeMixShader` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.527 ShaderNodeNewGeometry(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeNewGeometry` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.528 ShaderNodeNormal(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeNormal` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`

- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.529 ShaderNodeOutput(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeOutput` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.530 ShaderNodeOutputLamp(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeOutputLamp` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.531 ShaderNodeOutputMaterial(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeOutputMaterial` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.532 ShaderNodeOutputWorld(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeOutputWorld` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.533 ShaderNodeRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeRGB` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.534 ShaderNodeRGBCurve(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeRGBCurve` (*ShaderNode*)

mapping

Type `CurveMapping`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.535 ShaderNodeRGBToBW(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeRGBToBW` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.536 ShaderNodeSeparateRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeSeparateRGB` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.537 ShaderNodeSqueeze(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeSqueeze` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.538 ShaderNodeTexCoord(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexCoord` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.539 ShaderNodeTexEnvironment(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexEnvironment` (*ShaderNode*)

color_mapping
Color mapping settings

Type `ColorMapping`, (readonly, never None)

color_space

Image file color space

- `SRGB` sRGB, Image is in sRGB color space.
- `LINEAR` Linear, Image is in scene linear color space.

Type enum in [`'SRGB'`, `'LINEAR'`], default `'LINEAR'`

image

Type `Image`

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.540 ShaderNodeTexGradient(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexGradient` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

gradient_type

Sets the style of the color blending

- **LINEAR** Linear, Creates a linear progression.
- **QUADRATIC** Quadratic, Creates a quadratic progression.
- **EASING** Easing, Creates a progression easing from one step to the next.
- **DIAGONAL** Diagonal, Creates a diagonal progression.
- **SPHERICAL** Spherical, Creates a spherical progression.
- **QUADRATIC_SPHERE** Quadratic sphere, Creates a quadratic progression in the shape of a sphere.
- **RADIAL** Radial, Creates a radial progression.

Type enum in ['LINEAR', 'QUADRATIC', 'EASING', 'DIAGONAL', 'SPHERICAL', 'QUADRATIC_SPHERE', 'RADIAL'], default 'LINEAR'

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.541 ShaderNodeTexImage(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexImage` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

color_space

Image file color space

- **LINEAR** Linear, Image is in scene linear color space.
- **SRGB** sRGB, Image is in sRGB color space.

Type enum in ['LINEAR', 'SRGB'], default 'LINEAR'

image

Type `Image`

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.542 ShaderNodeTexMagic(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexMagic` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

turbulence_depth

Level of detail in the added turbulent noise

Type `int` in [0, 10], default 0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.543 ShaderNodeTexMusgrave(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexMusgrave` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

musgrave_type

Type enum in `['MULTIFRACTAL', 'RIDGED_MULTIFRACTAL', 'HYBRID_MULTIFRACTAL', 'FBM', 'HETERO_TERRAIN']`, default `'MULTIFRACTAL'`

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.544 ShaderNodeTexNoise(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexNoise` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.545 ShaderNodeTexSky(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexSky` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

sun_direction

Direction from where the sun is shining

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

turbidity

Type float in `[-inf, inf]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.546 ShaderNodeTexVoronoi(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexVoronoi` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

coloring

- `INTENSITY` Intensity, Only calculate intensity.
- `CELLS` Cells, Color cells by position.

Type enum in [`'INTENSITY'`, `'CELLS'`], default `'INTENSITY'`

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.547 ShaderNodeTexWave(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexWave` (*ShaderNode*)

color_mapping

Color mapping settings

Type `ColorMapping`, (readonly, never None)

texture_mapping

Texture coordinate mapping settings

Type `TexMapping`, (readonly, never None)

wave_type

- **BANDS** Bands, Uses standard wave texture in bands.
- **RINGS** Rings, Uses wave texture in rings.

Type enum in ['BANDS', 'RINGS'], default 'BANDS'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.548 ShaderNodeTexture(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeTexture` (*ShaderNode*)

node_output

For node-based textures, which output node to use

Type `int` in `[-32768, 32767]`, default `0`

texture

Type `Texture`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.549 ShaderNodeTree(NodeTree)

base classes — `bpy_struct`, `ID`, `NodeTree`

class `bpy.types.ShaderNodeTree` (*NodeTree*)

Node tree consisting of linked nodes used for materials

nodes

Type ShaderNodes bpy_prop_collection of Node, (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- NodeTree.animation_data
- NodeTree.grease_pencil
- NodeTree.inputs
- NodeTree.links
- NodeTree.outputs
- NodeTree.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values
- ID.copy
- ID.user_clear
- ID.animation_data_create
- ID.animation_data_clear
- ID.update_tag

2.4.550 ShaderNodeValToRGB(ShaderNode)

base classes — bpy_struct, Node, ShaderNode

class bpy.types.**ShaderNodeValToRGB** (*ShaderNode*)

color_ramp

Type ColorRamp, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.551 ShaderNodeValue(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeValue` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.552 ShaderNodeVectorCurve(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeVectorCurve` (*ShaderNode*)

mapping

Type `CurveMapping`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.553 ShaderNodeVectorMath(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeVectorMath` (*ShaderNode*)

operation

Type enum in ['ADD', 'SUBTRACT', 'AVERAGE', 'DOT_PRODUCT', 'CROSS_PRODUCT', 'NORMALIZE'], default 'ADD'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.554 ShaderNodeVolumeIsotropic(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeVolumeIsotropic` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.555 ShaderNodeVolumeTransparent(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeVolumeTransparent` (*ShaderNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`

- `Node.parent`
- `Node.show_texture`
- `ShaderNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.556 ShaderNodes(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ShaderNodes` (*bpy_struct*)
Collection of Shader Nodes

new (*type*, *group=None*)
Add a node to this node tree

Parameters

- **type** (*enum in ['OUTPUT', 'MATERIAL', 'RGB', 'VALUE', 'MIX_RGB', 'VALTORGB', 'RGBTOBW', 'TEXTURE', 'NORMAL', 'GEOMETRY', 'MAPPING', 'CURVE_VEC', 'CURVE_RGB', 'CAMERA', 'MATH', 'VECT_MATH', 'SQUEEZE', 'MATERIAL_EXT', 'INVERT', 'SEPRGB', 'COMBRGB', 'HUE_SAT', 'OUTPUT_MATERIAL', 'OUTPUT_WORLD', 'OUTPUT_LAMP', 'FRESNEL', 'MIX_SHADER', 'ATTRIBUTE', 'BACKGROUND', 'BSDF_DIFFUSE', 'BSDF_GLOSSY', 'BSDF_GLASS', 'BSDF_TRANSLUCENT', 'BSDF_TRANSPARENT', 'BSDF_VELVET', 'EMISSION', 'NEW_GEOMETRY', 'LIGHT_PATH', 'TEX_IMAGE', 'TEX_SKY', 'TEX_GRADIENT', 'TEX_VORONOI', 'TEX_MAGIC', 'TEX_WAVE', 'TEX_NOISE', 'TEX_MUSGRAVE', 'TEX_COORD', 'ADD_SHADER', 'TEX_ENVIRONMENT', 'HOLDOUT', 'LAYER_WEIGHT', 'VOLUME_TRANSPARENT', 'VOLUME_ISOTROPIC', 'SCRIPT', 'GROUP']*) – Type, Type of node to add
- **group** (`NodeTree`, (optional)) – The group tree

Returns New node

Return type `Node`

remove (*node*)
Remove a node from this node tree

Parameters `node` (`Node`) – The node to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ShaderNodeTree.nodes`

2.4.557 ShapeActionActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.ShapeActionActuator` (*Actuator*)
Actuator to control shape key animations

action

Type `Action`

frame_blend_in

Number of frames of motion blending

Type `int` in `[0, 32767]`, default `0`

frame_end

Type `float` in `[-inf, inf]`, default `0.0`

frame_property

Assign the action's current frame number to this property

Type `string`, default `""`

frame_start

Type float in [-inf, inf], default 0.0

mode

Action playback type

Type enum in ['PLAY', 'PINGPONG', 'FLIPPER', 'LOOPSTOP', 'LOOPEND', 'PROPERTY'], default 'PLAY'

priority

Execution priority - lower numbers will override actions with higher numbers (with 2 or more actions at once, the overriding channels must be lower in the stack)

Type int in [0, 100], default 0

property

Use this property to define the Action position

Type string, default ""

use_continue_last_frame

Restore last frame when switching on/off, otherwise play from the start each time

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.558 ShapeKey(*bpy_struct*)

base class — *bpy_struct*

class *bpy.types.ShapeKey* (*bpy_struct*)

Shape key in a shape keys datablock

data

Type *bpy_prop_collection* of *UnknownType*, (readonly)

frame

Frame for absolute keys

Type float in [-inf, inf], default 0.0, (readonly)

interpolation

Interpolation type

Type enum in ['KEY_LINEAR', 'KEY_CARDINAL', 'KEY_BSPLINE'], default 'KEY_LINEAR'

mute

Mute this shape key

Type boolean, default False

name

Name of Shape Key

Type string, default ""

relative_key

Shape used as a relative key

Type *ShapeKey*

slider_max

Maximum for slider

Type float in [-10, 10], default 1.0

slider_min

Minimum for slider

Type float in [-10, 10], default 0.0

value

Value of shape key at the current frame

Type float in [0, 1], default 0.0

vertex_group

Vertex weight group, to blend with basis shape

Type string, default ""

Inherited Properties

- *bpy_struct.id_data*

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ClothSettings.rest_shape_key`
- `Key.key_blocks`
- `Key.reference_key`
- `Object.active_shape_key`
- `Object.shape_key_add`
- `ShapeKey.relative_key`

2.4.559 ShapeKeyBezierPoint(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ShapeKeyBezierPoint` (*bpy_struct*)

Point in a shape key for Bezier curves

co

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

handle_left

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

handle_right

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.560 ShapeKeyCurvePoint(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ShapeKeyCurvePoint` (*bpy_struct*)

Point in a shape key for curves

co

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

tilt

Type float in `[-inf, inf]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.561 ShapeKeyPoint(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ShapeKeyPoint` (*bpy_struct*)
Point in a shape key

co

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.562 ShrinkwrapConstraint(`Constraint`)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.ShrinkwrapConstraint` (*Constraint*)
Creates constraint-based shrinkwrap relationship

distance

Distance to Target

Type float in `[0, 100]`, default `0.0`

shrinkwrap_type

Selects type of shrinkwrap algorithm for target position

- `NEAREST_SURFACE` Nearest Surface Point, Shrinks the location to the nearest target surface.

- PROJECT Project, Shrinks the location to the nearest target surface along a given axis.
- NEAREST_VERTEX Nearest Vertex, Shrinks the location to the nearest target vertex.

Type enum in ['NEAREST_SURFACE', 'PROJECT', 'NEAREST_VERTEX'], default 'NEAREST_SURFACE'

target

Target Object

Type Object

use_x

Projection over X Axis

Type boolean, default False

use_y

Projection over Y Axis

Type boolean, default False

use_z

Projection over Z Axis

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Constraint.name
- Constraint.active
- Constraint.mute
- Constraint.show_expanded
- Constraint.influence
- Constraint.error_location
- Constraint.owner_space
- Constraint.is_proxy_local
- Constraint.error_rotation
- Constraint.target_space
- Constraint.type
- Constraint.is_valid

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.563 ShrinkwrapModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.ShrinkwrapModifier` (*Modifier*)

Shrink wrapping modifier to shrink wrap and object to a target

auxiliary_target

Additional mesh target to shrink to

Type `Object`

cull_face

Stop vertices from projecting to a the face on the target when facing towards/away

Type `enum` in ['OFF', 'FRONT', 'BACK'], default 'OFF'

offset

Distance to keep from the target

Type `float` in [-inf, inf], default 0.0

subsurf_levels

Number of subdivisions that must be performed before extracting vertices' positions and normals

Type `int` in [0, 6], default 0

target

Mesh target to shrink to

Type `Object`

use_keep_above_surface

Type `boolean`, default `False`

use_negative_direction

Allow vertices to move in the negative direction of axis

Type `boolean`, default `False`

use_positive_direction

Allow vertices to move in the positive direction of axis

Type `boolean`, default `False`

use_project_x

Type `boolean`, default `False`

use_project_y

Type `boolean`, default `False`

use_project_z

Type `boolean`, default `False`

vertex_group

Vertex group name

Type string, default ""**wrap_method**

- NEAREST_SURFACEPOINT Nearest Surface Point, Shrinks the mesh to the nearest target surface.
- PROJECT Project, Shrinks the mesh to the nearest target surface along a given axis.
- NEAREST_VERTEX Nearest Vertex, Shrinks the mesh to the nearest target vertex.

Type enum in ['NEAREST_SURFACEPOINT', 'PROJECT', 'NEAREST_VERTEX'], default 'NEAREST_SURFACEPOINT'**Inherited Properties**

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.564 SimpleDeformModifier(Modifier)base classes — `bpy_struct`, `Modifier`**class** `bpy.types.SimpleDeformModifier` (*Modifier*)

Simple deformation modifier to apply effects such as twisting and bending

deform_method

- TWIST Twist, Rotates around the Z axis of the modifier space.
- BEND Bend, Bends the mesh over the Z axis of the modifier space.
- TAPER Taper, Linearly scales along Z axis of the modifier space.
- STRETCH Stretch, Stretches the object along the Z axis of the modifier space.

Type enum in ['TWIST', 'BEND', 'TAPER', 'STRETCH'], default 'TWIST'

factor

Amount to deform object

Type float in [-inf, inf], default 0.0

limits

Lower/Upper limits for deform

Type float array of 2 items in [0, 1], default (0.0, 0.0)

lock_x

Do not allow tapering along the X axis

Type boolean, default False

lock_y

Do not allow tapering along the Y axis

Type boolean, default False

origin

Origin of modifier space coordinates

Type Object

use_relative

Sets the origin of deform space to be relative to the object

Type boolean, default False

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- bpy_struct.id_data
- Modifier.name
- Modifier.use_apply_on_spline
- Modifier.show_in_editmode
- Modifier.show_expanded
- Modifier.show_on_cage
- Modifier.show_viewport
- Modifier.show_render
- Modifier.type

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.565 SmokeCollSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SmokeCollSettings` (*`bpy_struct`*)
Smoke collision settings

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SmokeModifier.coll_settings`

2.4.566 SmokeDomainSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SmileDomainSettings` (*bpy_struct*)
Smoke domain settings

alpha

How much density affects smoke motion (higher value results in faster rising smoke)

Type float in [-5, 5], default 0.0

amplify

Enhance the resolution of smoke by this factor using noise

Type int in [1, 10], default 0

beta

How much heat affects smoke motion (higher value results in faster rising smoke)

Type float in [-5, 5], default 0.0

collision_extents

Select which domain border will be treated as collision object

- **BORDEROPEN** Open, Smoke doesn't collide with any border.
- **BORDERVERTICAL** Vertically Open, Smoke doesn't collide with top and bottom sides.
- **BORDERCLOSED** Collide All, Smoke collides with every side.

Type enum in ['BORDEROPEN', 'BORDERVERTICAL', 'BORDERCLOSED'], default 'BORDEROPEN'

collision_group

Limit collisions to this group

Type Group

dissolve_speed

Dissolve Speed

Type int in [1, 10000], default 0

effector_group

Limit effectors to this group

Type Group

effector_weights

Type `EffectorWeights`, (readonly)

fluid_group

Limit fluid objects to this group

Type Group

noise_type

Noise method which is used for creating the high resolution

Type enum in ['NOISEWAVE'], default 'NOISEWAVE'

point_cache

Type `PointCache`, (readonly, never None)

point_cache_compress_type

Compression method to be used

- CACHELIGHT Light, Fast but not so effective compression.
- CACHEHEAVY Heavy, Effective but slow compression.

Type enum in ['CACHELIGHT', 'CACHEHEAVY'], default 'CACHELIGHT'

resolution_max

Maximal resolution used in the fluid domain

Type int in [24, 512], default 0

show_high_resolution

Show high resolution (using amplification)

Type boolean, default False

smooth_emitter

Smoothen emitted smoke to avoid blockiness

Type boolean, default False

strength

Strength of noise

Type float in [0, 10], default 0.0

time_scale

Adjust simulation speed

Type float in [0.2, 1.5], default 0.0

use_dissolve_smoke

Enable smoke to disappear over time

Type boolean, default False

use_dissolve_smoke_log

Using 1/x

Type boolean, default False

use_high_resolution

Enable high resolution (using amplification)

Type boolean, default False

vorticity

Amount of turbulence/rotation in fluid

Type float in [0.01, 4], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SmokeModifier.domain_settings`

2.4.567 SmokeFlowSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SmokeFlowSettings` (*`bpy_struct`*)
Smoke flow settings

density

Type float in [0.001, 1], default 0.0

initial_velocity

Smoke inherits its velocity from the emitter particle

Type boolean, default False

particle_system

Particle systems emitted from the object

Type `ParticleSystem`

temperature

Temperature difference to ambient temperature

Type float in [-10, 10], default 0.0

use_absolute

Only allow given density value in emitter area

Type boolean, default False

use_outflow

Delete smoke from simulation

Type boolean, default False

velocity_factor

Multiplier to adjust velocity passed to smoke

Type float in [-2, 2], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SmokeModifier.flow_settings`

2.4.568 SmokeModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.SmokeModifier` (*Modifier*)

Smoke simulation modifier

coll_settings

Type `SmokeCollSettings`, (readonly)

domain_settings

Type `SmokeDomainSettings`, (readonly)

flow_settings

Type SmokeFlowSettings, (readonly)

smoke_type

- NONE None.
- DOMAIN Domain.
- FLOW Flow, Inflow/Outflow.
- COLLISION Collision.

Type enum in ['NONE', 'DOMAIN', 'FLOW', 'COLLISION'], default 'NONE'

Inherited Properties

- bpy_struct.id_data
- Modifier.name
- Modifier.use_apply_on_spline
- Modifier.show_in_editmode
- Modifier.show_expanded
- Modifier.show_on_cage
- Modifier.show_viewport
- Modifier.show_render
- Modifier.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.569 SmoothModifier(Modifier)

base classes — bpy_struct, Modifier

class bpy.types.**SmoothModifier** (*Modifier*)
Smoothing effect modifier

factor

Strength of modifier effect

Type float in $[-\text{inf}, \text{inf}]$, default 0.0

iterations

Type int in $[-32768, 32767]$, default 0

use_x

Smooth object along X axis

Type boolean, default False

use_y

Smooth object along Y axis

Type boolean, default False

use_z

Smooth object along Z axis

Type boolean, default False

vertex_group

Name of Vertex Group which determines influence of modifier per point

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.570 SoftBodyModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.SoftBodyModifier` (*Modifier*)
Soft body simulation modifier

point_cache

Type `PointCache`, (readonly, never None)

settings

Type `SoftBodySettings`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.571 SoftBodySettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SoftBodySettings` (*bpy_struct*)
Soft body simulation settings for an object

aero

Make edges ‘sail’

Type int in [0, 30000], default 0

aerodynamics_type

Method of calculating aerodynamic interaction

- SIMPLE Simple, Edges receive a drag force from surrounding media.
- LIFT_FORCE Lift Force, Edges receive a lift force when passing through surrounding media.

Type enum in ['SIMPLE', 'LIFT_FORCE'], default 'SIMPLE'

ball_damp

Blending to inelastic collision

Type float in [0.001, 1], default 0.0

ball_size

Absolute ball size or factor if not manual adjusted

Type float in [-10, 10], default 0.0

ball_stiff

Ball inflating pressure

Type float in [0.001, 100], default 0.0

bend

Bending Stiffness

Type float in [0, 10], default 0.0

choke

'Viscosity' inside collision target

Type int in [0, 100], default 0

collision_type

Choose Collision Type

- MANUAL Manual, Manual adjust.
- AVERAGE Average, Average Spring length * Ball Size.
- MINIMAL Minimal, Minimal Spring length * Ball Size.
- MAXIMAL Maximal, Maximal Spring length * Ball Size.
- MINMAX AvMinMax, (Min+Max)/2 * Ball Size.

Type enum in ['MANUAL', 'AVERAGE', 'MINIMAL', 'MAXIMAL', 'MINMAX'], default 'MANUAL'

damping

Edge spring friction

Type float in [0, 50], default 0.0

effector_weights

Type `EffectorWeights`, (readonly)

error_threshold

The Runge-Kutta ODE solver error limit, low value gives more precision, high values speed

Type float in [0.001, 10], default 0.0

friction

General media friction for point movements

Type float in [0, 50], default 0.0

fuzzy

Fuzziness while on collision, high values make collision handling faster but less stable

Type int in [1, 100], default 0

goal_default

Default Goal (vertex target position) value, when no Vertex Group used

Type float in [0, 1], default 0.0

goal_friction

Goal (vertex target position) friction

Type float in [0, 50], default 0.0

goal_max

Goal maximum, vertex weights are scaled to match this range

Type float in [0, 1], default 0.0

goal_min

Goal minimum, vertex weights are scaled to match this range

Type float in [0, 1], default 0.0

goal_spring

Goal (vertex target position) spring stiffness

Type float in [0, 0.999], default 0.0

gravity

Apply gravitation to point movement

Type float in [-10, 10], default 0.0

location_mass_center

Location of Center of mass

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

mass

General Mass value

Type float in [0, 50000], default 0.0

plastic

Permanent deform

Type int in [0, 100], default 0

pull

Edge spring stiffness when longer than rest length

Type float in [0, 0.999], default 0.0

push

Edge spring stiffness when shorter than rest length

Type float in [0, 0.999], default 0.0

rotation_estimate

Estimated rotation matrix

Type float array of 9 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

scale_estimate

Estimated scale matrix

Type float array of 9 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

shear

Shear Stiffness

Type float in $[0, 1]$, default 0.0

speed

Tweak timing for physics to control frequency and speed

Type float in $[0.01, 100]$, default 0.0

spring_length

Alter spring length to shrink/blow up (unit %) 0 to disable

Type int in $[0, 200]$, default 0

step_max

Maximal # solver steps/frame

Type int in $[0, 30000]$, default 0

step_min

Minimal # solver steps/frame

Type int in $[0, 30000]$, default 0

use_auto_step

Use velocities for automagic step sizes

Type boolean, default False

use_diagnose

Turn on SB diagnose console prints

Type boolean, default False

use_edge_collision

Edges collide too

Type boolean, default False

use_edges

Use Edges as springs

Type boolean, default False

use_estimate_matrix

Estimate matrix... split to COM, ROT, SCALE

Type boolean, default False

use_face_collision

Faces collide too, can be very slow

Type boolean, default False

use_goal

Define forces for vertices to stick to animated position

Type boolean, default False

- use_self_collision**
Enable naive vertex ball self collision
Type boolean, default False
- use_stiff_quads**
Add diagonal springs on 4-gons
Type boolean, default False
- vertex_group_goal**
Control point weight values
Type string, default ""
- vertex_group_mass**
Control point mass values
Type string, default ""
- vertex_group_spring**
Control point spring strength values
Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.soft_body`
- `SoftBodyModifier.settings`

2.4.572 SolidifyModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.SolidifyModifier` (*Modifier*)

Create a solid skin by extruding, compensating for sharp angles

edge_crease_inner

Assign a crease to inner edges

Type float in [0, 1], default 0.0

edge_crease_outer

Assign a crease to outer edges

Type float in [0, 1], default 0.0

edge_crease_rim

Assign a crease to the edges making up the rim

Type float in [0, 1], default 0.0

invert_vertex_group

Invert the vertex group influence

Type boolean, default False

material_offset

Offset material index of generated faces

Type int in [-32768, 32767], default 0

material_offset_rim

Offset material index of generated rim faces

Type int in [-32768, 32767], default 0

offset

Offset the thickness from the center

Type float in [-inf, inf], default 0.0

thickness

Thickness of the shell

Type float in [-inf, inf], default 0.0

thickness_vertex_group

Thickness factor to use for zero vertex group influence

Type float in [0, 1], default 0.0

use_even_offset

Maintain thickness by adjusting for sharp corners (slow, disable when not needed)

Type boolean, default False

use_quality_normals

Calculate normals which result in more even thickness (slow, disable when not needed)

Type boolean, default False

use_rim

Create edge loops between the inner and outer surfaces on face edges (slow, disable when not needed)

Type boolean, default False

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- bpy_struct.id_data
- Modifier.name
- Modifier.use_apply_on_spline
- Modifier.show_in_editmode
- Modifier.show_expanded
- Modifier.show_on_cage
- Modifier.show_viewport
- Modifier.show_render
- Modifier.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.573 Sound(ID)

base classes — bpy_struct, ID

class bpy.types.**Sound**(ID)

Sound datablock referencing an external or packed sound file

filepath

Sound sample file used by this Sound datablock

Type string, default ""

packed_file

Type PackedFile, (readonly)

use_memory_cache

The sound file is decoded and loaded into RAM

Type boolean, default False

use_mono

If the file contains multiple audio channels they are rendered to a single one

Type boolean, default False

factory

The aud.Factory object of the sound. (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.sounds`
- `SoundActuator.sound`
- `SoundSequence.sound`
- `Speaker.sound`

2.4.574 SoundActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.SoundActuator` (*Actuator*)

Sound file

cone_inner_angle_3d

The angle of the inner cone

Type float in [-inf, inf], default 0.0

cone_outer_angle_3d

The angle of the outer cone

Type float in [-inf, inf], default 0.0

cone_outer_gain_3d

The gain outside the outer cone (the gain in the outer cone will be interpolated between this value and the normal gain in the inner cone)

Type float in [-inf, inf], default 0.0

distance_3d_max

The maximum distance at which you can hear the sound

Type float in [-inf, inf], default 0.0

distance_3d_reference

The distance where the sound has a gain of 1.0

Type float in [-inf, inf], default 0.0

gain_3d_max

The maximum gain of the sound, no matter how near it is

Type float in [-inf, inf], default 0.0

gain_3d_min

The minimum gain of the sound, no matter how far it is away

Type float in [-inf, inf], default 0.0

mode

Type enum in ['PLAYSTOP', 'PLAYEND', 'LOOPSTOP', 'LOOPEND', 'LOOPBIDIRECTIONAL', 'LOOPBIDIRECTIONALSTOP'], default 'PLAYSTOP'

pitch

Pitch of the sound

Type float in [-inf, inf], default 0.0

rolloff_factor_3d

The influence factor on volume depending on distance

Type float in [-inf, inf], default 0.0

sound

Type `Sound`

use_sound_3d

Enable/Disable 3D Sound

Type boolean, default False

volume

Initial volume of the sound

Type float in [0, 2], default 0.0**Inherited Properties**

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.575 SoundSequence(Sequence)base classes — `bpy_struct`, `Sequence`**class** `bpy.types.SoundSequence` (*Sequence*)

Sequence strip defining a sound to be played over a period of time

animation_offset_end

Animation end offset (trim end)

Type int in [0, inf], default 0**animation_offset_start**

Animation start offset (trim start)

Type int in [0, inf], default 0**filepath****Type** string, default ""

pan

Playback panning of the sound (only for Mono sources)

Type float in [-2, 2], default 0.0

pitch

Playback pitch of the sound

Type float in [0.1, 10], default 0.0

sound

Sound datablock used by this sequence

Type `Sound`, (readonly)

volume

Playback volume of the sound

Type float in [0, 100], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.576 Space(`bpy_struct`)

base class — `bpy_struct`

subclasses — `SpaceUserPreferences`, `SpaceOutliner`, `SpaceImageEditor`, `SpaceSequenceEditor`, `SpaceProperties`, `SpaceGraphEditor`, `SpaceLogicEditor`, `SpaceInfo`, `SpaceConsole`, `SpaceNodeEditor`, `SpaceClipEditor`, `SpaceView3D`, `SpaceDopeSheetEditor`, `SpaceTextEditor`, `SpaceFileBrowser`, `SpaceNLA`, `SpaceTimeline`

class `bpy.types.Space` (*`bpy_struct`*)

Space data for a screen area

type

Space data type

Type enum in ['EMPTY', 'VIEW_3D', 'GRAPH_EDITOR', 'OUTLINER', 'PROPERTIES', 'FILE_BROWSER', 'IMAGE_EDITOR', 'INFO', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'DOPE SHEET_EDITOR', 'NLA_EDITOR', 'TIMELINE', 'NODE_EDITOR', 'LOGIC_EDITOR', 'CONSOLE', 'USER_PREFERENCES', 'CLIP_EDITOR'], default 'EMPTY', (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Area.spaces`
- `AreaSpaces.active`
- `Context.space_data`

2.4.577 SpaceClipEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceClipEditor` (*Space*)

Clip editor space data

clip

Movie clip displayed and edited in this space

Type `MovieClip`

clip_user

Parameters defining which frame of the movie clip is displayed

Type `MovieClipUser`, (readonly, never None)

lock_selection

Lock viewport to selected markers during playback

Type boolean, default False

mode

Editing context being displayed

- `TRACKING` Tracking, Show tracking and solving tools.
- `RECONSTRUCTION` Reconstruction, Show tracking/reconstruction tools.
- `DISTORTION` Distortion, Show distortion tools.

Type enum in ['TRACKING', 'RECONSTRUCTION', 'DISTORTION'], default 'TRACKING'

path_length

Length of displaying path, in frames

Type int in [0, 50], default 0

scopes

Scopes to visualize movie clip statistics

Type `MovieClipScopes`, (readonly)

show_bundles

Show projection of bundles into footage

Type boolean, default False

show_disabled

Show disabled tracks from the footage

Type boolean, default False

show_filters

Show filters for graph editor

Type boolean, default False

show_graph_frames

Show curve for per-frame average error (camera motion should be solved first)

Type boolean, default False

show_graph_tracks

Display the speed curves (in “x” direction red, in “y” direction green) for the selected tracks

Type boolean, default False

show_grease_pencil

Show grease pencil strokes over the footage

Type boolean, default False

show_grid

Show grid showing lens distortion

Type boolean, default False

show_marker_pattern

Show pattern boundingbox for markers

Type boolean, default False

show_marker_search

Show search boundingbox for markers

Type boolean, default False

show_names

Show track names and status

Type boolean, default False

show_pyramid_levels

Show patterns for each pyramid level for markers (KLT only)

Type boolean, default False

show_stable

Show stable footage in editor (if stabilization is enabled)

Type boolean, default False

show_tiny_markers

Show markers in a more compact manner

Type boolean, default False

show_track_path

Show path of how track moves

Type boolean, default False

use_manual_calibration

Use manual calibration helpers

Type boolean, default False

use_mute_footage

Mute footage and show black background instead

Type boolean, default False

view

Type of the clip editor view

- CLIP Clip, Show editing clip preview.
- GRAPH Graph, Show graph view for active element.

Type enum in ['CLIP', 'GRAPH'], default 'CLIP'

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.578 SpaceConsole(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceConsole` (*Space*)

Interactive python console

font_size

Font size to use for displaying the text

Type int in [8, 32], default 0

history

Command history

Type bpy_prop_collection of ConsoleLine, (readonly)**language**

Command line prompt language

Type string, default ""**prompt**

Command line prompt

Type string, default ""**scrollback**

Command output

Type bpy_prop_collection of ConsoleLine, (readonly)**select_end****Type** int in [0, inf], default 0**select_start****Type** int in [0, inf], default 0**Inherited Properties**

- bpy_struct.id_data
- Space.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.579 SpaceDopeSheetEditor(Space)

base classes — bpy_struct, Space

class `bpy.types.SpaceDopeSheetEditor` (*Space*)

DopeSheet space data

action

Action displayed and edited in this space

Type `Action`

auto_snap

Automatic time snapping settings for transformations

- NONE No Auto-Snap.
- STEP Time Step, Snap to 1.0 frame/second intervals.
- FRAME Nearest Frame, Snap to actual frames/seconds (nla-action time).
- MARKER Nearest Marker, Snap to nearest marker.

Type enum in ['NONE', 'STEP', 'FRAME', 'MARKER'], default 'NONE'

dopesheet

Settings for filtering animation data

Type `DopeSheet`, (readonly)

mode

Editing context being displayed

- DOPESHEET DopeSheet, DopeSheet Editor.
- ACTION Action Editor, Action Editor.
- SHAPEKEY ShapeKey Editor, ShapeKey Editor.
- GPENCIL Grease Pencil, Grease Pencil.

Type enum in ['DOPESHEET', 'ACTION', 'SHAPEKEY', 'GPENCIL'], default 'ACTION'

show_frame_indicator

Show frame number beside the current frame indicator line

Type boolean, default False

show_pose_markers

Show markers belonging to the active action instead of Scene markers (Action and Shape Key Editors only)

Type boolean, default False

show_seconds

Show timing in seconds not frames

Type boolean, default False, (readonly)

show_sliders

Show sliders beside F-Curve channels

Type boolean, default False

use_auto_merge_keyframes

Automatically merge nearby keyframes

Type boolean, default False

use_marker_sync

Sync Markers with keyframe edits

Type boolean, default False**use_realtime_update**

When transforming keyframes, changes to the animation data are flushed to other views

Type boolean, default False**Inherited Properties**

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.580 SpaceFileBrowser(Space)base classes — `bpy_struct`, `Space`**class** `bpy.types.SpaceFileBrowser` (*Space*)

File browser space data

active_operator**Type** `Operator`, (readonly)**params**

Parameters and Settings for the Filebrowser

Type `FileSelectParams`, (readonly)**Inherited Properties**

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.581 SpaceGraphEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceGraphEditor` (*Space*)

Graph Editor space data

auto_snap

Automatic time snapping settings for transformations

- **NONE** No Auto-Snap.
- **STEP** Time Step, Snap to 1.0 frame/second intervals.
- **FRAME** Nearest Frame, Snap to actual frames/seconds (nla-action time).
- **MARKER** Nearest Marker, Snap to nearest marker.

Type enum in ['NONE', 'STEP', 'FRAME', 'MARKER'], default 'NONE'

cursor_position_y

Graph Editor 2D-Value cursor - Y-Value component

Type float in [-inf, inf], default 0.0

dopesheet

Settings for filtering animation data

Type `DopeSheet`, (readonly)

has_ghost_curves

Graph Editor instance has some ghost curves stored

Type boolean, default False

mode

Editing context being displayed

- **FCURVES** F-Curve Editor, Edit animation/keyframes displayed as 2D curves.
- **DRIVERS** Drivers, Edit drivers.

Type enum in ['FCURVES', 'DRIVERS'], default 'FCURVES'

pivot_point

Pivot center for rotation/scaling

Type enum in ['BOUNDING_BOX_CENTER', 'CURSOR', 'INDIVIDUAL_ORIGINS'], default 'BOUNDING_BOX_CENTER'

show_cursor

Show 2D cursor

Type boolean, default False

show_frame_indicator

Show frame number beside the current frame indicator line

Type boolean, default False

show_handles

Show handles of Bezier control points

Type boolean, default False

show_seconds

Show timing in seconds not frames

Type boolean, default False, (readonly)

show_sliders

Show sliders beside F-Curve channels

Type boolean, default False

use_auto_merge_keyframes

Automatically merge nearby keyframes

Type boolean, default False

use_beauty_drawing

Draw F-Curves using Anti-Aliasing and other fancy effects (disable for better performance)

Type boolean, default False

use_only_selected_curves_handles

Only keyframes of selected F-Curves are visible and editable

Type boolean, default False

use_only_selected_keyframe_handles

Only show and edit handles of selected keyframes

Type boolean, default False

use_realtime_update

When transforming keyframes, changes to the animation data are flushed to other views

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.582 SpaceImageEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceImageEditor` (*Space*)

Image and UV editor space data

curve

Color curve mapping to use for displaying the image

Type `CurveMapping`, (readonly)

draw_channels

Channels of the image to draw

- **COLOR** Color, Draw image with RGB colors.
- **COLOR_ALPHA** Color and Alpha, Draw image with RGB colors and alpha transparency.
- **ALPHA** Alpha, Draw alpha transparency channel.
- **Z_BUFFER** Z-Buffer, Draw Z-buffer associated with image (mapped from camera clip start to end).

Type enum in ['COLOR', 'COLOR_ALPHA', 'ALPHA', 'Z_BUFFER'], default 'COLOR'

grease_pencil

Grease pencil data for this space

Type `GreasePencil`

image

Image displayed and edited in this space

Type `Image`

image_user

Parameters defining which layer, pass and frame of the image is displayed

Type `ImageUser`, (readonly, never None)

sample_histogram

Sampled colors along line

Type `Histogram`, (readonly)

scopes

Scopes to visualize image statistics

Type `Scopes`, (readonly)

show_paint

Show paint related properties

Type boolean, default `False`, (readonly)

show_render

Show render related properties

Type boolean, default `False`, (readonly)

show_repeat

Draw the image repeated outside of the main view

Type boolean, default `False`

show_uvedit

Show UV editing related properties

Type boolean, default `False`, (readonly)

use_grease_pencil

Display and edit the grease pencil freehand annotations overlay

Type boolean, default `False`

use_image_paint

Enable image painting mode

Type boolean, default `False`

use_image_pin

Display current image regardless of object selection

Type boolean, default `False`

use_realtime_update

Update other affected window spaces automatically to reflect changes during interactive operations such as transform

Type boolean, default `False`

uv_editor

UV editor settings

Type `SpaceUVEditor`, (readonly, never `None`)

zoom

Zoom factor

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.583 SpaceInfo(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceInfo` (*Space*)
Info space data

show_report_debug
Display debug reporting info
Type boolean, default False

show_report_error
Display error text
Type boolean, default False

show_report_info
Display general information
Type boolean, default False

show_report_operator
Display the operator log
Type boolean, default False

show_report_warning
Display warnings
Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.584 SpaceLogicEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceLogicEditor` (*Space*)

Logic editor space data

show_actuators_active_object

Show actuators of active object

Type boolean, default False

show_actuators_active_states

Show only actuators connected to active states

Type boolean, default False

show_actuators_linked_controller

Show linked objects to the actuator

Type boolean, default False

show_actuators_selected_objects

Show actuators of all selected objects

Type boolean, default False

show_controllers_active_object

Show controllers of active object

Type boolean, default False

show_controllers_linked_controller

Show linked objects to sensor/actuator

Type boolean, default False

show_controllers_selected_objects

Show controllers of all selected objects

Type boolean, default False

show_sensors_active_object

Show sensors of active object

Type boolean, default False

show_sensors_active_states

Show only sensors connected to active states

Type boolean, default False

show_sensors_linked_controller

Show linked objects to the controller

Type boolean, default False

show_sensors_selected_objects

Show sensors of all selected objects

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.585 SpaceNLA(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceNLA` (*Space*)

NLA editor space data

auto_snap

Automatic time snapping settings for transformations

- **NONE** No Auto-Snap.
- **STEP** Time Step, Snap to 1.0 frame/second intervals.

- FRAME Nearest Frame, Snap to actual frames/seconds (nla-action time).
- MARKER Nearest Marker, Snap to nearest marker.

Type enum in ['NONE', 'STEP', 'FRAME', 'MARKER'], default 'NONE'

dopesheet

Settings for filtering animation data

Type `DopeSheet`, (readonly)

show_frame_indicator

Show frame number beside the current frame indicator line

Type boolean, default False

show_seconds

Show timing in seconds not frames

Type boolean, default False, (readonly)

show_strip_curves

Show influence F-Curves on strips

Type boolean, default False

use_realtime_update

When transforming strips, changes to the animation data are flushed to other views

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.586 SpaceNodeEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceNodeEditor` (*Space*)

Node editor space data

backdrop_channels

Channels of the image to draw

- `COLOR` Color, Draw image with RGB colors.
- `COLOR_ALPHA` Color and Alpha, Draw image with RGB colors and alpha transparency.
- `ALPHA` Alpha, Draw alpha transparency channel.

Type enum in [`'COLOR'`, `'COLOR_ALPHA'`, `'ALPHA'`], default `'COLOR'`

backdrop_x

Backdrop X offset

Type float in `[-inf, inf]`, default `0.0`

backdrop_y

Backdrop Y offset

Type float in `[-inf, inf]`, default `0.0`

backdrop_zoom

Backdrop zoom factor

Type float in `[0.01, inf]`, default `1.0`

id

Datablock whose nodes are being edited

Type `ID`, (readonly)

id_from

Datablock from which the edited datablock is linked

Type `ID`, (readonly)

node_tree

Node tree being displayed and edited

Type `NodeTree`

shader_type

Type of data to take shader from

- `OBJECT` Object, Edit shader nodes from Object.
- `WORLD` World, Edit shader nodes from World.

Type enum in [`'OBJECT'`, `'WORLD'`], default `'OBJECT'`

show_backdrop

Use active Viewer Node output as backdrop for compositing nodes

Type boolean, default `False`

texture_type

Type of data to take texture from

- OBJECT Object, Edit texture nodes from Object.
- WORLD World, Edit texture nodes from World.
- BRUSH Brush, Edit texture nodes from Brush.

Type enum in ['OBJECT', 'WORLD', 'BRUSH'], default 'OBJECT'

tree_type

Node tree type to display and edit

- SHADER Shader, Shader nodes.
- TEXTURE Texture, Texture nodes.
- COMPOSITING Compositing, Compositing nodes.

Type enum in ['SHADER', 'TEXTURE', 'COMPOSITING'], default 'SHADER'

use_auto_render

Re-render and composite changed layers on 3D edits

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.587 SpaceOutliner(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceOutliner` (*Space*)
Outliner space data

display_mode

Type of information to display

- **ALL_SCENES** All Scenes, Display datablocks in all scenes.
- **CURRENT_SCENE** Current Scene, Display datablocks in current scene.
- **VISIBLE_LAYERS** Visible Layers, Display datablocks in visible layers.
- **SELECTED** Selected, Display datablocks of selected objects.
- **ACTIVE** Active, Display datablocks of active object.
- **SAME_TYPES** Same Types, Display datablocks of all objects of same type as selected object.
- **GROUPS** Groups, Display groups and their datablocks.
- **LIBRARIES** Libraries, Display libraries.
- **SEQUENCE** Sequence, Display sequence datablocks.
- **DATABLOCKS** Datablocks, Display raw datablocks.
- **USER_PREFERENCES** User Preferences, Display the user preference datablocks.
- **KEYMAPS** Key Maps, Display keymap datablocks.

Type enum in ['ALL_SCENES', 'CURRENT_SCENE', 'VISIBLE_LAYERS', 'SELECTED', 'ACTIVE', 'SAME_TYPES', 'GROUPS', 'LIBRARIES', 'SEQUENCE', 'DATABLOCKS', 'USER_PREFERENCES', 'KEYMAPS'], default 'ALL_SCENES'

filter_text

Live search filtering string

Type string, default ""

show_restrict_columns

Show column

Type boolean, default False

use_filter_case_sensitive

Only use case sensitive matches of search string

Type boolean, default False

use_filter_complete

Only use complete matches of search string

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.588 SpaceProperties(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceProperties` (*Space*)
Properties space data

align

Arrangement of the panels

Type enum in ['HORIZONTAL', 'VERTICAL'], default 'HORIZONTAL'

context

Type of active data to display and edit

- `SCENE` Scene, Scene.
- `RENDER` Render, Render.
- `WORLD` World, World.
- `OBJECT` Object, Object.
- `CONSTRAINT` Constraints, Constraints.
- `MODIFIER` Modifiers, Modifiers.
- `DATA` Data, Data.
- `BONE` Bone, Bone.
- `BONE_CONSTRAINT` Bone Constraints, Bone Constraints.
- `MATERIAL` Material, Material.
- `TEXTURE` Texture, Texture.
- `PARTICLES` Particles, Particle.
- `PHYSICS` Physics, Physics.

Type enum in ['SCENE', 'RENDER', 'WORLD', 'OBJECT', 'CONSTRAINT', 'MODIFIER', 'DATA', 'BONE', 'BONE_CONSTRAINT', 'MATERIAL', 'TEXTURE', 'PARTICLES', 'PHYSICS'], default 'RENDER'

pin_id

Type ID

texture_context

Type of texture data to display and edit

- MATERIAL Material, Material.

Type enum in ['MATERIAL'], default 'MATERIAL'

use_pin_id

Use the pinned context

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Space.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.589 SpaceSequenceEditor(Space)

base classes — bpy_struct, Space

class bpy.types.SpaceSequenceEditor (*Space*)

Sequence editor space data

display_channel

The channel number shown in the image preview. 0 is the result of all strips combined

Type int in [-5, 32], default 0

display_mode

View mode to use for displaying sequencer output

Type enum in ['IMAGE', 'WAVEFORM', 'VECTOR_SCOPE', 'HISTOGRAM'], default 'IMAGE'

draw_overexposed

Show overexposed areas with zebra stripes

Type int in [0, 110], default 0

grease_pencil

Grease pencil data for this space

Type `UnknownType`, (readonly)

offset_x

Offset image horizontally from the view center

Type float in [-inf, inf], default 0.0

offset_y

Offset image vertically from the view center

Type float in [-inf, inf], default 0.0

proxy_render_size

Draw preview using full resolution or different proxy resolutions

Type enum in ['NONE', 'SCENE', 'PROXY_25', 'PROXY_50', 'PROXY_75', 'PROXY_100', 'FULL'], default 'SCENE'

show_frame_indicator

Show frame number beside the current frame indicator line

Type boolean, default False

show_frames

Draw frames rather than seconds

Type boolean, default False

show_safe_margin

Draw title safe margins in preview

Type boolean, default False

show_separate_color

Separate color channels in preview

Type boolean, default False

use_grease_pencil

Display and edit the grease pencil freehand annotations overlay

Type boolean, default False

use_marker_sync

Transform markers as well as strips

Type boolean, default False

view_type

Type of the Sequencer view (sequencer, preview or both)

Type enum in ['SEQUENCER', 'PREVIEW', 'SEQUENCER_PREVIEW'], default 'SEQUENCER'

zoom

Display zoom level

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.590 SpaceTextEditor(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceTextEditor` (*Space*)

Text editor space data

find_text

Text to search for with the find tool

Type string, default ""

font_size

Font size to use for displaying the text

Type int in [8, 32], default 0

margin_column

Column number to show right margin at

Type int in [0, 1024], default 0

replace_text

Text to replace selected text with using the replace tool

Type string, default ""

show_line_highlight

Highlight the current line

Type boolean, default False

show_line_numbers

Show line numbers next to the text

Type boolean, default False

show_margin

Show right margin

Type boolean, default False

show_syntax_highlight

Syntax highlight for scripting

Type boolean, default False

show_word_wrap

Wrap words if there is not enough horizontal space

Type boolean, default False

tab_width

Number of spaces to display tabs with

Type int in [2, 8], default 0

text

Text displayed and edited in this space

Type `Text`

use_find_all

Search in all text datablocks, instead of only the active one

Type boolean, default False

use_find_wrap

Search again from the start of the file when reaching the end

Type boolean, default False

use_live_edit

Run python while editing

Type boolean, default False

use_match_case

Search string is sensitive to uppercase and lowercase letters

Type boolean, default False

use_overwrite

Overwrite characters when typing rather than inserting them

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.591 SpaceTimeline(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceTimeline` (*Space*)

Timeline editor space data

cache_cloth

Show the active object's cloth point cache

Type boolean, default False

cache_dynamicpaint

Show the active object's Dynamic Paint cache

Type boolean, default False

cache_particles

Show the active object's particle point cache

Type boolean, default False

cache_smoke

Show the active object's smoke cache

Type boolean, default False

cache_softbody

Show the active object's softbody point cache

Type boolean, default False

show_cache

Show the status of cached frames in the timeline

Type boolean, default False

show_frame_indicator

Show frame number beside the current frame indicator line

Type boolean, default False

show_only_selected

Show keyframes for active Object and/or its selected bones only

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.592 SpaceUVEditor(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SpaceUVEditor` (*bpy_struct*)

UV editor data for the image editor space

cursor_location

2D cursor location for this view

Type float array of 2 items in `[-inf, inf]`, default `(0.0, 0.0)`

draw_stretch_type

Type of stretch to draw

- **ANGLE** Angle, Angular distortion between UV and 3D angles.
- **AREA** Area, Area distortion between UV and 3D faces.

Type enum in `['ANGLE', 'AREA']`, default `'ANGLE'`

edge_draw_type

Draw type for drawing UV edges

- **OUTLINE** Outline, Draw white edges with black outline.
- **DASH** Dash, Draw dashed black-white edges.
- **BLACK** Black, Draw black edges.
- **WHITE** White, Draw white edges.

Type enum in `['OUTLINE', 'DASH', 'BLACK', 'WHITE']`, default `'OUTLINE'`

lock_bounds

Constraint to stay within the image bounds while editing

Type boolean, default False

pivot_point

Rotation/Scaling Pivot

Type enum in ['CENTER', 'MEDIAN', 'CURSOR'], default 'CENTER'

show_faces

Draw faces over the image

Type boolean, default False

show_modified_edges

Draw edges after modifiers are applied

Type boolean, default False

show_normalized_coords

Display UV coordinates from 0.0 to 1.0 rather than in pixels

Type boolean, default False

show_other_objects

Draw other selected objects that share the same image

Type boolean, default False

show_smooth_edges

Draw UV edges anti-aliased

Type boolean, default False

show_stretch

Draw faces colored according to the difference in shape between UVs and their 3D coordinates (blue for low distortion, red for high distortion)

Type boolean, default False

sticky_select_mode

Automatically select also UVs sharing the same vertex as the ones being selected

- DISABLED Disabled, Sticky vertex selection disabled.
- SHARED_LOCATION Shared Location, Select UVs that are at the same location and share a mesh vertex.
- SHARED_VERTEX Shared Vertex, Select UVs that share mesh vertex, irrespective if they are in the same location.

Type enum in ['DISABLED', 'SHARED_LOCATION', 'SHARED_VERTEX'], default 'SHARED_LOCATION'

use_live_unwrap

Continuously unwrap the selected UV island while transforming pinned vertices

Type boolean, default False

use_snap_to_pixels

Snap UVs to pixel locations while editing

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `SpaceImageEditor.uv_editor`

2.4.593 SpaceUserPreferences(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceUserPreferences` (*Space*)

User preferences space data

filter_text

Search term for filtering in the UI

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.594 SpaceView3D(Space)

base classes — `bpy_struct`, `Space`

class `bpy.types.SpaceView3D` (*Space*)

3D View space data

background_images

List of background images

Type `BackgroundImages` `bpy_prop_collection` of `BackgroundImage`, (read-only)

camera

Active camera used in this view (when unlocked from the scene's active camera)

Type `Object`

clip_end

3D View far clipping distance

Type float in [1, inf], default 0.0

clip_start

3D View near clipping distance

Type float in [0.001, inf], default 0.0

current_orientation

Current transformation orientation

Type `TransformOrientation`, (readonly)

cursor_location

3D cursor location for this view (dependent on local view setting)

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid_lines

Number of grid lines to display in perspective view

Type int in [0, 1024], default 0

grid_scale

Distance between 3D View grid lines

Type float in [0, inf], default 0.0

grid_subdivisions

Number of subdivisions between grid lines

Type int in [1, 1024], default 0

layers

Layers visible in this 3D View

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False)

layers_used

Layers that contain something

Type boolean array of 20 items, default (False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False, False), (readonly)

lens

Lens angle (mm) in perspective view

Type float in [1, 250], default 0.0

local_view

Display an isolated sub-set of objects, apart from the scene visibility

Type `SpaceView3D`, (readonly)

lock_bone

3D View center is locked to this bone's position

Type string, default ""

lock_camera

Enable view navigation within the camera view

Type boolean, default False

lock_camera_and_layers

Use the scene's active camera and layers in this view, rather than local layers

Type boolean, default False

lock_cursor

3D View center is locked to the cursor's position

Type boolean, default False

lock_object

3D View center is locked to this object's position

Type `Object`

pivot_point

Pivot center for rotation/scaling

- `BOUNDING_BOX_CENTER` Bounding Box Center, Pivot around bounding box center of selected object(s).
- `CURSOR_3D` Cursor, Pivot around the 3D cursor.
- `INDIVIDUAL_ORIGINS` Individual Origins, Pivot around each object's own origin.
- `MEDIAN_POINT` Median Point, Pivot around the median point of selected objects.
- `ACTIVE_ELEMENT` Active Element, Pivot around active object.

Type enum in ['`BOUNDING_BOX_CENTER`', '`CURSOR`', '`INDIVIDUAL_ORIGINS`', '`MEDIAN_POINT`', '`ACTIVE_ELEMENT`'], default '`BOUNDING_BOX_CENTER`'

region_3d

3D region in this space, in case of quad view the camera region

Type `RegionView3D`, (readonly)

region_quadview

3D region that defines the quad view settings

Type `RegionView3D`, (readonly)

show_all_objects_origin

Show the object origin center dot for all (selected and unselected) objects

Type boolean, default False

show_axis_x

Show the X axis line in perspective view

Type boolean, default False

show_axis_y

Show the Y axis line in perspective view

Type boolean, default False

show_axis_z

Show the Z axis line in perspective view

Type boolean, default False

show_background_images

Display reference images behind objects in the 3D View

Type boolean, default False

show_camera_path

Show reconstructed camera path

Type boolean, default False

show_floor

Show the ground plane grid in perspective view

Type boolean, default False

show_manipulator

Use a 3D manipulator widget for controlling transforms

Type boolean, default False

show_only_render

Display only objects which will be rendered

Type boolean, default False

show_outline_selected

Show an outline highlight around selected objects in non-wireframe views

Type boolean, default False

show_reconstruction

Display reconstruction data from active movie clip

Type boolean, default False

show_relationship_lines

Show dashed lines indicating parent or constraint relationships

Type boolean, default False

show_textured_solid

Display face-assigned textures in solid view

Type boolean, default False

show_tracks_name

Show names for tracks objects

Type boolean, default False

tracks_draw_size

Display size of tracks from reconstructed data

Type float in [0, inf], default 0.0

tracks_draw_type

Viewport display style for tracks

Type enum in ['PLAIN_AXES', 'ARROWS', 'SINGLE_ARROW', 'CIRCLE', 'CUBE', 'SPHERE', 'CONE'], default 'PLAIN_AXES'

transform_orientation

Transformation orientation

- GLOBAL Global, Align the transformation axes to world space.
- LOCAL Local, Align the transformation axes to the selected objects' local space.
- GIMBAL Gimbal, Align each axis to the Euler rotation axis as used for input.
- NORMAL Normal, Align the transformation axes to average normal of selected elements (bone Y axis for pose mode).
- VIEW View, Align the transformation axes to the window.
- CUSTOM Custom, Use a custom transform orientation.

Type enum in ['GLOBAL', 'LOCAL', 'GIMBAL', 'NORMAL', 'VIEW', 'CUSTOM'], default 'GLOBAL'

use_manipulator_rotate

Use the manipulator for rotation transformations

Type boolean, default False

use_manipulator_scale

Use the manipulator for scale transformations

Type boolean, default False

use_manipulator_translate

Use the manipulator for movement transformations

Type boolean, default False

use_occlude_geometry

Limit selection to visible (clipped with depth buffer)

Type boolean, default False

use_pivot_point_align

Manipulate center points (object and pose mode only)

Type boolean, default False

viewport_shade

Method to display/shade objects in the 3D View

- **BOUNDBOX** Bounding Box, Display the object's local bounding boxes only.
- **WIREFRAME** Wireframe, Display the object as wire edges.
- **SOLID** Solid, Display the object solid, lit with default OpenGL lights.
- **TEXTURED** Texture, Display the object solid, with a texture.
- **MATERIAL** Material, Display objects solid, with GLSL material.
- **RENDERED** Rendered, Display render preview.

Type enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED', 'MATERIAL', 'RENDERED'], default 'BOUNDBOX'

Inherited Properties

- `bpy_struct.id_data`
- `Space.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ObjectBase.layers_from_view`
- `SpaceView3D.local_view`

2.4.595 Speaker(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Speaker` (*ID*)

Speaker datablock for 3D audio speaker objects

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

attenuation

How strong the distance affects volume, depending on distance model

Type float in [0, inf], default 0.0

cone_angle_inner

Inner angle of the cone in degrees, inside the cone the volume is 100 %

Type float in [0, 360], default 0.0

cone_angle_outer

Outer angle of the cone in degrees, outside this cone the volume is the outer cone volume, between inner and outer cone the volume is interpolated

Type float in [0, 360], default 0.0

cone_volume_outer

Volume outside the outer cone

Type float in [0, 1], default 0.0

distance_max

Maximum distance for volume calculation, no matter how far away the object is

Type float in [0, inf], default 0.0

distance_reference

Reference distance at which volume is 100 %

Type float in [0, inf], default 0.0

muted

Mutes the speaker

Type boolean, default False

pitch

Playback pitch of the sound

Type float in [0.1, 10], default 0.0

sound

Sound datablock used by this speaker

Type `Sound`

volume

How loud the sound is

Type float in [0, 1], default 0.0

volume_max

Maximum volume, no matter how near the object is

Type float in [0, 1], default 0.0

volume_min

Minimum volume, no matter how far away the object is

Type float in [0, 1], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.speakers`
- `BlendDataSpeakers.new`
- `BlendDataSpeakers.remove`

2.4.596 SpeedControlSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

class `bpy.types.SpeedControlSequence` (*EffectSequence*)

Sequence strip to control the speed of other strips

multiply_speed

Multiply the resulting speed after the speed factor

Type float in [0, inf], default 0.0

scale_to_length

Scale values from 0.0 to 1.0 to target sequence length

Type boolean, default False

use_as_speed

Interpret the value as speed instead of a frame number

Type boolean, default False

use_frame_blend

Blend two frames into the target for a smoother result

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`

- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`
- `EffectSequence.strobe`
- `EffectSequence.transform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.597 Spline(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Spline` (*bpy_struct*)

Element of a curve, either NURBS, Bezier or Polyline or a character with text objects

bezier_points

Collection of points for Bezier curves only

Type `SplineBezierPoints` `bpy_prop_collection` of `BezierSplinePoint`,
(readonly)

character_index

Location of this character in the text data (only for text curves)

Type `int` in `[0, inf]`, default `0`, (readonly)

hide

Hide this curve in editmode

Type `boolean`, default `False`

material_index

Type `int` in `[0, 32767]`, default `0`

order_u

NURBS order in the U direction (for splines and surfaces, higher values let points influence a greater area)

Type int in [2, 6], default 0

order_v

NURBS order in the V direction (for surfaces only, higher values let points influence a greater area)

Type int in [2, 6], default 0

point_count_u

Total number points for the curve or surface in the U direction

Type int in [0, 32767], default 0, (readonly)

point_count_v

Total number points for the surface on the V direction

Type int in [0, 32767], default 0, (readonly)

points

Collection of points that make up this poly or nurbs spline

Type `SplinePoints` `bpy_prop_collection` of `SplinePoint`, (readonly)

radius_interpolation

The type of radius interpolation for Bezier curves

Type enum in ['LINEAR', 'CARDINAL', 'BSPLINE', 'EASE'], default 'LINEAR'

resolution_u

Curve or Surface subdivisions per segment

Type int in [1, 32767], default 0

resolution_v

Surface subdivisions per segment

Type int in [1, 32767], default 0

tilt_interpolation

The type of tilt interpolation for 3D, Bezier curves

Type enum in ['LINEAR', 'CARDINAL', 'BSPLINE', 'EASE'], default 'LINEAR'

type

The interpolation type for this curve element

Type enum in ['POLY', 'BEZIER', 'BSPLINE', 'CARDINAL', 'NURBS'], default 'POLY'

use_bezier_u

Make this nurbs curve or surface act like a Bezier spline in the U direction (Order U must be 3 or 4, Cyclic U must be disabled)

Type boolean, default False

use_bezier_v

Make this nurbs surface act like a Bezier spline in the V direction (Order V must be 3 or 4, Cyclic V must be disabled)

Type boolean, default False

use_cyclic_u

Make this curve or surface a closed loop in the U direction

Type boolean, default False

use_cyclic_v

Make this surface a closed loop in the V direction

Type boolean, default False

use_endpoint_u

Make this nurbs curve or surface meet the endpoints in the U direction (Cyclic U must be disabled)

Type boolean, default False

use_endpoint_v

Make this nurbs surface meet the endpoints in the V direction (Cyclic V must be disabled)

Type boolean, default False

use_smooth

Smooth the normals of the surface or beveled curve

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Curve.splines`
- `CurveSplines.new`
- `CurveSplines.remove`

2.4.598 SplineBezierPoints(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SplineBezierPoints` (*bpy_struct*)

Collection of spline bezier points

add (*count=1*)

Add a number of points to this spline

Parameters `count` (*int in [-inf, inf], (optional)*) – Number, Number of points to add to the spline

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Spline.bezier_points`

2.4.599 SplineIKConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.SplineIKConstraint` (*Constraint*)

Align 'n' bones along a curve

chain_count

How many bones are included in the chain

Type `int` in [1, 255], default 0

joint_bindings

(EXPERIENCED USERS ONLY) The relative positions of the joints along the chain as percentages

Type `float` array of 32 items in [0, 1], default (0.0, 0.0)

target

Curve that controls this relationship

Type `Object`

use_chain_offset

Offset the entire chain relative to the root joint

Type `boolean`, default `False`

use_curve_radius

Average radius of the endpoints is used to tweak the X and Z Scaling of the bones, on top of XZ Scale mode

Type `boolean`, default `False`

use_even_divisions

Ignore the relative lengths of the bones when fitting to the curve

Type `boolean`, default `False`

use_y_stretch

Stretch the Y axis of the bones to fit the curve

Type `boolean`, default `False`

xz_scale_mode

Method used for determining the scaling of the X and Z axes of the bones

- `NONE` None, Don't scale the X and Z axes (Default).
- `BONE_ORIGINAL` Bone Original, Use the original scaling of the bones.
- `VOLUME_PRESERVE` Volume Preservation, Scale of the X and Z axes is the inverse of the Y-Scale.

Type `enum` in [`'NONE'`, `'BONE_ORIGINAL'`, `'VOLUME_PRESERVE'`], default `'NONE'`

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`

- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.600 SplinePoint(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.SplinePoint` (*bpy_struct*)
Spline point without handles

co

Point coordinates

Type float array of 4 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0, 0.0)`

hide

Visibility status

Type boolean, default `False`

radius

Radius for bevelling

Type float in `[0, inf]`, default `0.0`

select

Selection status

Type boolean, default `False`

tilt

Tilt in 3D View

Type float in `[-inf, inf]`, default `0.0`

weight

NURBS weight

Type float in `[-inf, inf]`, default `0.0`

weight_softbody

Softbody goal weight

Type float in `[0.01, 100]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Spline.points`

2.4.601 SplinePoints(bpy_struct)

base class — `bpy_struct`

class `bpy.types.SplinePoints` (*bpy_struct*)
Collection of spline points

add (*count=1*)

Add a number of points to this spline

Parameters **count** (*int in [1, inf], (optional)*) – Number, Number of points to add to the spline

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Spline.points`

2.4.602 SpotLamp(Lamp)

base classes — `bpy_struct`, `ID`, `Lamp`

class `bpy.types.SpotLamp` (*Lamp*)

Directional cone lamp

compression_threshold

Deep shadow map compression threshold

Type float in [0, 1], default 0.0

falloff_curve

Custom Lamp Falloff Curve

Type `CurveMapping`, (readonly)

falloff_type

Intensity Decay with distance

Type enum in ['CONSTANT', 'INVERSE_LINEAR', 'INVERSE_SQUARE', 'CUSTOM_CURVE', 'LINEAR_QUADRATIC_WEIGHTED'], default 'CONSTANT'

halo_intensity

Brightness of the spotlight's halo cone

Type float in [-inf, inf], default 0.0

halo_step

Volumetric halo sampling frequency

Type int in [0, 12], default 0

linear_attenuation

Linear distance attenuation

Type float in [0, 1], default 0.0

quadratic_attenuation

Quadratic distance attenuation

Type float in [0, 1], default 0.0

shadow_adaptive_threshold

Threshold for Adaptive Sampling (Raytraced shadows)

Type float in [0, 1], default 0.0

shadow_buffer_bias

Shadow buffer sampling bias

Type float in [0.001, 5], default 0.0

shadow_buffer_clip_end

Shadow map clip end beyond which objects will not generate shadows

Type float in [0, 9999], default 0.0

shadow_buffer_clip_start

Shadow map clip start: objects closer will not generate shadows

Type float in [0, 9999], default 0.0

shadow_buffer_samples

Number of shadow buffer samples

Type int in [1, 16], default 0

shadow_buffer_size

Resolution of the shadow buffer, higher values give crisper shadows but use more memory

Type int in [512, 10240], default 0

shadow_buffer_soft

Size of shadow buffer sampling area

Type float in [0, 100], default 0.0

shadow_buffer_type

Type of shadow buffer

- REGULAR Classical, Classic shadow buffer.
- HALFWAY Classic-Halfway, Regular buffer, averaging the closest and 2nd closest Z value to reducing bias artifacts.
- IRREGULAR Irregular, Irregular buffer produces sharp shadow always, but it doesn't show up for raytracing.
- DEEP Deep, Deep shadow buffer supports transparency and better filtering, at the cost of more memory usage and processing time.

Type enum in ['REGULAR', 'HALFWAY', 'IRREGULAR', 'DEEP'], default 'REGULAR'

shadow_color

Color of shadows cast by the lamp

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

shadow_filter_type

Type of shadow filter (Buffer Shadows)

- BOX Box, Apply the Box filter to shadow buffer samples.
- TENT Tent, Apply the Tent Filter to shadow buffer samples.
- GAUSS Gauss, Apply the Gauss filter to shadow buffer samples.

Type enum in ['BOX', 'TENT', 'GAUSS'], default 'BOX'

shadow_method

Method to compute lamp shadow with

- NOSHADOW No Shadow.
- BUFFER_SHADOW Buffer Shadow, Lets spotlight produce shadows using shadow buffer.
- RAY_SHADOW Ray Shadow, Use ray tracing for shadow.

Type enum in ['NOSHADOW', 'BUFFER_SHADOW', 'RAY_SHADOW'], default 'NOSHADOW'

shadow_ray_sample_method

Method for generating shadow samples: Adaptive QMC is fastest, Constant QMC is less noisy but slower

Type enum in ['ADAPTIVE_QMC', 'CONSTANT_QMC'], default 'ADAPTIVE_QMC'

shadow_ray_samples

Amount of samples taken extra (samples x samples)

Type int in [1, 64], default 0

shadow_sample_buffers

Number of shadow buffers to render for better AA, this increases memory usage

- BUFFERS_1 1, Only one buffer rendered.
- BUFFERS_4 4, Renders 4 buffers for better AA, this quadruples memory usage.
- BUFFERS_9 9, Renders 9 buffers for better AA, this uses nine times more memory.

Type enum in ['BUFFERS_1', 'BUFFERS_4', 'BUFFERS_9'], default 'BUFFERS_1'

shadow_soft_size

Light size for ray shadow sampling (Raytraced shadows)

Type float in [-inf, inf], default 0.0

show_cone

Draw transparent cone in 3D view to visualize which objects are contained in it

Type boolean, default False

spot_blend

The softness of the spotlight edge

Type float in [0, 1], default 0.0

spot_size

Angle of the spotlight beam in degrees

Type float in [0.0174533, 3.14159], default 0.0

use_auto_clip_end

Automatic calculation of clipping-end, based on visible vertices

Type boolean, default False

use_auto_clip_start

Automatic calculation of clipping-start, based on visible vertices

Type boolean, default False

use_halo

Renders spotlight with a volumetric halo

Type boolean, default False

use_only_shadow

Causes light to cast shadows only without illuminating objects

Type boolean, default False

use_shadow_layer

Causes only objects on the same layer to cast shadows

Type boolean, default False

use_sphere

Sets light intensity to zero beyond lamp distance

Type boolean, default False

use_square

Casts a square spot light shape

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Lamp.active_texture`
- `Lamp.active_texture_index`
- `Lamp.animation_data`
- `Lamp.color`
- `Lamp.use_diffuse`
- `Lamp.distance`
- `Lamp.energy`
- `Lamp.use_own_layer`
- `Lamp.use_negative`
- `Lamp.node_tree`
- `Lamp.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`
- `Lamp.use_nodes`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.603 StateActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.StateActuator` (*Actuator*)

Actuator to handle states

operation

Select the bit operation on object state mask

Type enum in ['SET', 'ADD', 'REMOVE', 'CHANGE'], default 'SET'

states

Type boolean array of 30 items, default (False, False)

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`

- `Actuator.unlink`

2.4.604 SteeringActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

`class bpy.types.SteeringActuator` (*Actuator*)

acceleration

Max acceleration

Type float in [0, 1000], default 0.0

distance

Relax distance

Type float in [0, 1000], default 0.0

facing

Enable automatic facing

Type boolean, default False

facing_axis

Axis for automatic facing

Type enum in ['X', 'Y', 'Z', 'NEG_X', 'NEG_Y', 'NEG_Z'], default 'X'

mode

Type enum in ['SEEK', 'FLEE', 'PATHFOLLOWING'], default 'SEEK'

navmesh

Navigation mesh

Type `Object`

normal_up

Use normal of the navmesh to set “UP” vector

Type boolean, default False

self_terminated

Terminate when target is reached

Type boolean, default False

show_visualization

Enable debug visualization

Type boolean, default False

target

Target object

Type `Object`

turn_speed

Max turn speed

Type float in [0, 720], default 0.0

update_period

Path update period

Type int in [-inf, inf], default 0

velocity

Velocity magnitude

Type float in [0, 1000], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.605 StretchToConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.StretchToConstraint` (*Constraint*)
Stretches to meet the target object

bulge

Factor between volume variation and stretching

Type float in [0, 100], default 0.0

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

keep_axis

Axis to maintain during stretch

- `PLANE_X` X, Keep X Axis.

- `PLANE_Z` Z, Keep Z Axis.

Type enum in [`'PLANE_X'`, `'PLANE_Z'`], default `'PLANE_X'`

rest_length

Length at rest position

Type float in [0, 100], default 0.0

subtarget

Type string, default `""`

target

Target Object

Type `Object`

volume

Maintain the object's volume as it stretches

Type enum in [`'VOLUME_XZX'`, `'VOLUME_X'`, `'VOLUME_Z'`, `'NO_VOLUME'`], default `'VOLUME_XZX'`

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.606 StringProperties(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.StringProperties` (*bpy_struct*)

Collection of string properties

new (*name="String Prop"*)

Add a string property layer to Mesh

Parameters **name** (*string, (optional)*) – String property name

Returns The newly created layer

Return type `MeshStringPropertyLayer`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.layers_string`

2.4.607 StringProperty(`Property`)

base classes — `bpy_struct`, `Property`

class `bpy.types.StringProperty` (*Property*)
RNA text string property definition

default
string default value

Type string, default "", (readonly)

length_max
Maximum length of the string, 0 means unlimited

Type int in [0, inf], default 0, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.is_animatable`
- `Property.srna`
- `Property.description`
- `Property.is_enum_flag`
- `Property.is_hidden`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `Property.is_runtime`
- `Property.is_skip_save`
- `Property.subtype`
- `Property.type`
- `Property.unit`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Struct.name_property`

2.4.608 Struct(bpy_struct)

base class — `bpy_struct`

class `bpy.types.Struct` (*bpy_struct*)
RNA structure definition

base

Struct definition this is derived from

Type `Struct`, (readonly)

description

Description of the Struct's purpose

Type string, default "", (readonly)

functions

Type `bpy_prop_collection` of `Function`, (readonly)

identifier

Unique name used in the code and scripting

Type string, default "", (readonly)

name

Human readable name

Type string, default "", (readonly)

name_property

Property that gives the name of the struct

Type `StringProperty`, (readonly)

nested

Struct in which this struct is always nested, and to which it logically belongs

Type `Struct`, (readonly)

properties

Properties in the struct

Type `bpy_prop_collection` of `Property`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BlenderRNA.structs`
- `CollectionProperty.fixed_type`
- `PointerProperty.fixed_type`
- `Property.srna`
- `Struct.base`
- `Struct.nested`

2.4.609 StucciTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.StucciTexture` (*Texture*)

Procedural noise texture

noise_basis

Sets the noise basis used for turbulence

- `BLENDER_ORIGINAL` Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- `ORIGINAL_PERLIN` Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- `IMPROVED_PERLIN` Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- `VORONOI_F1` Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- `VORONOI_F2` Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- `VORONOI_F3` Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- `VORONOI_F4` Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- `VORONOI_F2_F1` Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- `VORONOI_CRACKLE` Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.

- CELL_NOISE Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

noise_type

- SOFT_NOISE Soft, Generate soft noise (smooth transitions).
- HARD_NOISE Hard, Generate hard noise (sharp transitions).

Type enum in ['SOFT_NOISE', 'HARD_NOISE'], default 'SOFT_NOISE'

stucci_type

- PLASTIC Plastic, Uses standard stucci.
- WALL_IN Wall in, Creates Dimples.
- WALL_OUT Wall out, Creates Ridges.

Type enum in ['PLASTIC', 'WALL_IN', 'WALL_OUT'], default 'PLASTIC'

turbulence

Sets the turbulence of the bandnoise and ringnoise types

Type float in [0.0001, inf], default 0.0

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- Texture.animation_data
- Texture.intensity
- Texture.color_ramp
- Texture.contrast
- Texture.factor_blue
- Texture.factor_green
- Texture.factor_red

- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.610 SubsurfModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.SubsurfModifier` (*Modifier*)
Subdivision surface modifier

levels

Number of subdivisions to perform

Type int in [0, 32767], default 0

render_levels

Number of subdivisions to perform when rendering

Type int in [0, 32767], default 0

show_only_control_edges

Skip drawing/rendering of interior subdivided edges

Type boolean, default False

subdivision_type

Selects type of subdivision algorithm

Type enum in ['CATMULL_CLARK', 'SIMPLE'], default 'CATMULL_CLARK'

use_subsurf_uv

Use subsurf to subdivide UVs

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.611 SunLamp(Lamp)

base classes — `bpy_struct`, `ID`, `Lamp`

class `bpy.types.SunLamp` (*Lamp*)

Constant direction parallel ray lamp

shadow_adaptive_threshold

Threshold for Adaptive Sampling (Raytraced shadows)

Type float in [0, 1], default 0.0

shadow_color

Color of shadows cast by the lamp

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

shadow_method

Method to compute lamp shadow with

- NOSHADOW No Shadow.
- RAY_SHADOW Ray Shadow, Use ray tracing for shadow.

Type enum in ['NOSHADOW', 'RAY_SHADOW'], default 'NOSHADOW'

shadow_ray_sample_method

Method for generating shadow samples: Adaptive QMC is fastest, Constant QMC is less noisy but slower

Type enum in ['ADAPTIVE_QMC', 'CONSTANT_QMC'], default 'ADAPTIVE_QMC'

shadow_ray_samples

Amount of samples taken extra (samples x samples)

Type int in [1, 64], default 0

shadow_soft_size

Light size for ray shadow sampling (Raytraced shadows)

Type float in [-inf, inf], default 0.0

sky

Sky related settings for sun lamps

Type `LampSkySettings`, (readonly, never None)

use_only_shadow

Causes light to cast shadows only without illuminating objects

Type boolean, default False

use_shadow_layer

Causes only objects on the same layer to cast shadows

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Lamp.active_texture`
- `Lamp.active_texture_index`
- `Lamp.animation_data`
- `Lamp.color`
- `Lamp.use_diffuse`
- `Lamp.distance`

- `Lamp.energy`
- `Lamp.use_own_layer`
- `Lamp.use_negative`
- `Lamp.node_tree`
- `Lamp.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`
- `Lamp.use_nodes`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.612 SurfaceCurve(Curve)

base classes — `bpy_struct`, `ID`, `Curve`

class `bpy.types.SurfaceCurve` (*Curve*)

Curve datablock used for storing surfaces

use_uv_as_generated

Uses the UV values as Generated textured coordinates

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`

- ID.tag
- ID.users
- Curve.animation_data
- Curve.use_auto_texspace
- Curve.bevel_depth
- Curve.bevel_object
- Curve.bevel_resolution
- Curve.use_deform_bounds
- Curve.dimensions
- Curve.show_handles
- Curve.show_normal_face
- Curve.eval_time
- Curve.extrude
- Curve.fill_mode
- Curve.use_fill_deform
- Curve.use_path_follow
- Curve.materials
- Curve.offset
- Curve.use_time_offset
- Curve.use_path
- Curve.path_duration
- Curve.use_radius
- Curve.render_resolution_u
- Curve.render_resolution_v
- Curve.resolution_u
- Curve.resolution_v
- Curve.shape_keys
- Curve.splines
- Curve.use_stretch
- Curve.taper_object
- Curve.texspace_location
- Curve.texspace_size
- Curve.twist_mode
- Curve.twist_smooth
- Curve.use_uv_as_generated

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast

- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.613 SurfaceModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.SurfaceModifier` (*Modifier*)

Surface modifier defining modifier stack position used for surface fields

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.614 TexMapping(bpy_struct)

base class — `bpy_struct`

class `bpy.types.TexMapping` (*bpy_struct*)

Texture coordinate mapping settings

location

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

mapping

- FLAT Flat, Map X and Y coordinates directly.
- CUBE Cube, Map using the normal vector.
- TUBE Tube, Map with Z as central axis.
- SPHERE Sphere, Map with Z as central axis.

Type enum in ['FLAT', 'CUBE', 'TUBE', 'SPHERE'], default 'FLAT'

mapping_x

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_y

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

mapping_z

Type enum in ['NONE', 'X', 'Y', 'Z'], default 'NONE'

max

Maximum value for clipping

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

min

Minimum value for clipping

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

rotation

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scale

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

use_max

Whether to use maximum clipping value

Type boolean, default False

use_min

Whether to use minimum clipping value

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ShaderNodeTexEnvironment.texture_mapping`
- `ShaderNodeTexGradient.texture_mapping`
- `ShaderNodeTexImage.texture_mapping`
- `ShaderNodeTexMagic.texture_mapping`
- `ShaderNodeTexMusgrave.texture_mapping`
- `ShaderNodeTexNoise.texture_mapping`
- `ShaderNodeTexSky.texture_mapping`
- `ShaderNodeTexVoronoi.texture_mapping`
- `ShaderNodeTexWave.texture_mapping`

2.4.615 Text(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.Text` (*ID*)

Text datablock referencing an external or packed text file

current_character

Index of current character in current line, and also start index of character in selection if one exists

Type `int` in `[0, inf]`, default `0`, (readonly)

current_line

Current line, and start line of selection if one exists

Type `TextLine`, (readonly, never `None`)

filepath

Filename of the text file

Type `string`, default `""`

is_dirty

Text file has been edited since last save

Type boolean, default False, (readonly)

is_in_memory

Text file is in memory, without a corresponding file on disk

Type boolean, default False, (readonly)

is_modified

Text file on disk is different than the one in memory

Type boolean, default False, (readonly)

lines

Lines of text

Type `bpy_prop_collection` of `TextLine`, (readonly)

markers

Text markers highlighting part of the text

Type `bpy_prop_collection` of `TextMarker`, (readonly)

select_end_character

Index of character after end of selection in the selection end line

Type int in [0, inf], default 0, (readonly)

select_end_line

End line of selection

Type `TextLine`, (readonly, never None)

use_module

Register this text as a module on loading, Text name must end with ".py"

Type boolean, default False

use_tabs_as_spaces

Automatically converts all new tabs into spaces

Type boolean, default False

users_logic

Logic bricks that use this text (readonly)

clear ()

clear the text block

write (text)

write text at the cursor location and advance to the end of the text block

Parameters `text` (*string*) – New text for this datablock

static as_string (self)

Return the text as a string.

from_string (string)

Replace text with this string.

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`

- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.texts`
- `BlendDataTexts.load`
- `BlendDataTexts.new`
- `BlendDataTexts.remove`
- `Filter2DActuator.gls1_shader`
- `PythonConstraint.text`
- `PythonController.text`
- `SceneGameData.dome_text`
- `SpaceTextEditor.text`

2.4.616 TextBox(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TextBox` (*bpy_struct*)
Text bounding box for layout

height

Type float in [0, 50], default 0.0

width

Type float in [0, 50], default 0.0

x

Type float in [-50, 50], default 0.0

y

Type float in [-50, 50], default 0.0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `TextCurve.text_boxes`

2.4.617 TextCharacterFormat(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TextCharacterFormat` (*`bpy_struct`*)

Text character formatting settings

use_bold

Type boolean, default False

use_italic

Type boolean, default False

use_small_caps

Type boolean, default False

use_underline

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `TextCurve.body_format`
- `TextCurve.edit_format`

2.4.618 TextCurve(Curve)

base classes — `bpy_struct`, `ID`, `Curve`

class `bpy.types.TextCurve` (*Curve*)
Curve datablock used for storing text

active_textbox

Type int in [-inf, inf], default 0

align

Text align from the object center

- `LEFT` Left, Align text to the left.
- `CENTER` Center, Center text.
- `RIGHT` Right, Align text to the right.
- `JUSTIFY` Justify, Align to the left and the right.

•FLUSH Flush, Align to the left and the right, with equal character spacing.

Type enum in ['LEFT', 'CENTER', 'RIGHT', 'JUSTIFY', 'FLUSH'], default 'LEFT'

body

contents of this text object

Type string, default ""

body_format

Stores the style of each character

Type bpy_prop_collection of TextCharacterFormat, (readonly)

edit_format

Editing settings character formatting

Type TextCharacterFormat, (readonly)

family

Use Blender Objects as font characters. Give font objects a common name followed by the character it represents, eg. familia, familyb etc, and turn on Verts Duplication

Type string, default ""

follow_curve

Curve deforming text object

Type Object

font

Type VectorFont

font_bold

Type VectorFont

font_bold_italic

Type VectorFont

font_italic

Type VectorFont

offset_x

Horizontal offset from the object origin

Type float in [-50, 50], default 0.0

offset_y

Vertical offset from the object origin

Type float in [-50, 50], default 0.0

shear

Italic angle of the characters

Type float in [-1, 1], default 0.0

size

Type float in [0.0001, 10000], default 0.0

small_caps_scale

Scale of small capitals

Type float in [-inf, inf], default 0.0

space_character

Type float in [0, 10], default 0.0

space_line

Type float in [0, 10], default 0.0

space_word

Type float in [0, 10], default 0.0

text_boxes

Type `bpy_prop_collection` of `TextBox`, (readonly)

underline_height

Type float in [-0.2, 0.8], default 0.0

underline_position

Vertical position of underline

Type float in [-0.2, 0.8], default 0.0

use_fast_edit

Don't fill polygons while editing

Type boolean, default False

use_uv_as_generated

Uses the UV values as Generated textured coordinates

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Curve.animation_data`
- `Curve.use_auto_textrspace`
- `Curve.bevel_depth`
- `Curve.bevel_object`
- `Curve.bevel_resolution`
- `Curve.use_deform_bounds`
- `Curve.dimensions`
- `Curve.show_handles`
- `Curve.show_normal_face`
- `Curve.eval_time`
- `Curve.extrude`
- `Curve.fill_mode`
- `Curve.use_fill_deform`
- `Curve.use_path_follow`

- `Curve.materials`
- `Curve.offset`
- `Curve.use_time_offset`
- `Curve.use_path`
- `Curve.path_duration`
- `Curve.use_radius`
- `Curve.render_resolution_u`
- `Curve.render_resolution_v`
- `Curve.resolution_u`
- `Curve.resolution_v`
- `Curve.shape_keys`
- `Curve.splines`
- `Curve.use_stretch`
- `Curve.taper_object`
- `Curve.texspace_location`
- `Curve.texspace_size`
- `Curve.twist_mode`
- `Curve.twist_smooth`
- `Curve.use_uv_as_generated`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.619 TextLine(bpy_struct)

base class — `bpy_struct`

class `bpy.types.TextLine` (*bpy_struct*)
Line of text in a Text datablock

body
Text in the line

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Text.current_line`
- `Text.lines`
- `Text.select_end_line`

2.4.620 TextMarker(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TextMarker` (*bpy_struct*)
Marker highlighting a portion of text in a Text datablock

character_index_end

Start position of the marker in the line

Type int in [0, inf], default 0, (readonly)

character_index_start

Start position of the marker in the line

Type int in [0, inf], default 0, (readonly)

color

Color to display the marker with

Type float array of 4 items in [0, 1], default (0.0, 0.0, 0.0, 0.0)

group

Type int in [0, 65535], default 0, (readonly)

is_temporary

Marker is temporary

Type boolean, default False, (readonly)

line

Line in which the marker is located

Type int in [0, inf], default 0, (readonly)

use_edit_all

Edit all markers of the same group as one

Type boolean, default False, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Text.markers`

2.4.621 Texture(ID)

base classes — `bpy_struct`, `ID`

subclasses — `ImageTexture`, `MarbleTexture`, `EnvironmentMapTexture`, `PointDensityTexture`, `WoodTexture`, `BlendTexture`, `MusgraveTexture`, `StucciTexture`, `VoronoiTexture`, `MagicTexture`, `VoxelDataTexture`, `PluginTexture`, `OceanTexture`, `CloudsTexture`, `DistortedNoiseTexture`, `NoiseTexture`

class `bpy.types.Texture` (*ID*)

Texture datablock used by materials, lamps, worlds and brushes

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

color_ramp

Type `ColorRamp`, (readonly)

contrast

Adjust the contrast of the texture

Type float in [0.01, 5], default 0.0

factor_blue

Type float in [0, 2], default 0.0

factor_green

Type float in [0, 2], default 0.0

factor_red

Type float in [0, 2], default 0.0

intensity

Adjust the brightness of the texture

Type float in [0, 2], default 0.0

node_tree

Node tree for node-based textures

Type `NodeTree`, (readonly)

saturation

Adjust the saturation of colors in the texture

Type float in [0, 2], default 0.0

type

- NONE None.
- BLEND Blend, Procedural - create a ramp texture.
- CLOUDS Clouds, Procedural - create a cloud-like fractal noise texture.
- DISTORTED_NOISE Distorted Noise, Procedural - Noise texture distorted by two noise algorithms.
- ENVIRONMENT_MAP Environment Map, Create a render of the environment mapped to a texture.
- IMAGE Image or Movie, Allow for images or movies to be used as textures.
- MAGIC Magic, Procedural - Color texture based on trigonometric functions.
- MARBLE Marble, Procedural - Marble-like noise texture with wave generated bands.
- MUSGRAVE Musgrave, Procedural - Highly flexible fractal noise texture.
- NOISE Noise, Procedural - Random noise, gives a different result every time, for every frame, for every pixel.
- POINT_DENSITY Point Density.

- STUCCI Stucci, Procedural - Create a fractal noise texture.
- VORONOI Voronoi, Procedural - Create cell-like patterns based on Worley noise.
- VOXEL_DATA Voxel Data, Create a 3d texture based on volumetric data.
- WOOD Wood, Procedural - Wave generated bands or rings, with optional noise.
- OCEAN Ocean.

Type enum in ['NONE', 'BLEND', 'CLOUDS', 'DISTORTED_NOISE', 'ENVIRONMENT_MAP', 'IMAGE', 'MAGIC', 'MARBLE', 'MUSGRAVE', 'NOISE', 'POINT_DENSITY', 'STUCCI', 'VORONOI', 'VOXEL_DATA', 'WOOD', 'OCEAN'], default 'NONE'

use_color_ramp

Toggle color ramp operations

Type boolean, default False

use_nodes

Make this a node-based texture

Type boolean, default False

use_preview_alpha

Show Alpha in Preview Render

Type boolean, default False

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

evaluate (*value*)

Evaluate the texture at the coordinates given

Returns Result

Return type float array of 4 items in [-inf, inf]

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.textures`
- `BlendDataTextures.new`
- `BlendDataTextures.remove`
- `Brush.texture`
- `CompositorNodeTexture.texture`
- `DisplaceModifier.texture`
- `DynamicPaintSurface.init_texture`
- `FieldSettings.texture`
- `Lamp.active_texture`
- `Material.active_texture`
- `ParticleSettings.active_texture`
- `ShaderNodeTexture.texture`
- `TextureNodeTexture.texture`
- `TextureSlot.texture`
- `VertexWeightEditModifier.mask_texture`
- `VertexWeightMixModifier.mask_texture`
- `VertexWeightProximityModifier.mask_texture`
- `WarpModifier.texture`
- `WaveModifier.texture`
- `World.active_texture`

2.4.622 TextureNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `TextureNodeScale`, `TextureNodeRGBToBW`, `TextureNodeTranslate`,
`TextureNodeCompose`, `TextureNodeValToNor`, `TextureNodeDecompose`,
`TextureNodeHueSaturation`, `TextureNodeImage`, `TextureNodeTexture`, `TextureNodeBricks`,
`TextureNodeCurveTime`, `TextureNodeInvert`, `TextureNodeCurveRGB`, `TextureNodeDistance`,
`TextureNodeRotate`, `TextureNodeMixRGB`, `TextureNodeChecker`, `TextureNodeOutput`,
`TextureNodeCoordinates`, `TextureNodeValToRGB`, `TextureNodeMath`, `TextureNodeViewer`

class `bpy.types.TextureNode` (*Node*)

type

Type enum in ['OUTPUT', 'CHECKER', 'TEXTURE', 'BRICKS', 'MATH', 'MIX_RGB', 'RGBTOBW', 'VALTORGB', 'IMAGE', 'CURVE_RGB', 'INVERT', 'HUE_SAT', 'CURVE_TIME', 'ROTATE', 'VIEWER', 'TRANSLATE', 'COORD', 'DISTANCE', 'COMPOSE', 'DECOMPOSE', 'VALTONOR', 'SCALE', 'SCRIPT', 'GROUP'], default 'OUTPUT', (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.623 TextureNodeBricks(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeBricks` (*TextureNode*)

offset

Type float in [0, 1], default 0.0

offset_frequency

Offset every N rows

Type int in [2, 99], default 0

squash

Type float in [0, 99], default 0.0

squash_frequency

Squash every N rows

Type int in [2, 99], default 0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.624 TextureNodeChecker(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeChecker` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`

- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.625 TextureNodeCompose(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeCompose` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.626 TextureNodeCoordinates(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeCoordinates` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.627 TextureNodeCurveRGB(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeCurveRGB` (*TextureNode*)

mapping

Type `CurveMapping`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.628 TextureNodeCurveTime(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeCurveTime` (*TextureNode*)

curve

Type `CurveMapping`, (readonly)

frame_end

Type int in [-32768, 32767], default 0

frame_start

Type int in [-32768, 32767], default 0

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.629 TextureNodeDecompose(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeDecompose` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`

- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.630 TextureNodeDistance(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeDistance` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.631 TextureNodeHueSaturation(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeHueSaturation` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.632 TextureNodeImage(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeImage` (*TextureNode*)

image

Type Image

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.633 TextureNodeInvert(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeInvert` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`

- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.634 TextureNodeMath(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeMath` (*TextureNode*)

operation

Type enum in ['ADD', 'SUBTRACT', 'MULTIPLY', 'DIVIDE', 'SINE', 'COSINE', 'TANGENT', 'ARCSINE', 'ARCCOSINE', 'ARCTANGENT', 'POWER', 'LOGARITHM', 'MINIMUM', 'MAXIMUM', 'ROUND', 'LESS_THAN', 'GREATER_THAN'], default 'ADD'

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.635 TextureNodeMixRGB(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeMixRGB` (*TextureNode*)

blend_type

Type enum in ['MIX', 'ADD', 'MULTIPLY', 'SUBTRACT', 'SCREEN', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'OVERLAY', 'DODGE', 'BURN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

use_alpha

Include alpha of second input in this operation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.636 TextureNodeOutput(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeOutput` (*TextureNode*)

filepath

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.637 TextureNodeRGBToBW(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeRGBToBW` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.638 TextureNodeRotate(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeRotate` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`

- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.639 TextureNodeScale(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeScale` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.640 TextureNodeTexture(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeTexture` (*TextureNode*)

node_output

For node-based textures, which output node to use

Type `int` in `[-32768, 32767]`, default `0`

texture

Type `Texture`

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

2.4.641 TextureNodeTranslate(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeTranslate` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.642 TextureNodeTree(NodeTree)

base classes — `bpy_struct`, `ID`, `NodeTree`

class `bpy.types.TextureNodeTree` (*NodeTree*)
Node tree consisting of linked nodes used for textures

nodes

Type `TextureNodes` `bpy_prop_collection` of `Node`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `NodeTree.animation_data`
- `NodeTree.grease_pencil`
- `NodeTree.inputs`
- `NodeTree.links`
- `NodeTree.outputs`
- `NodeTree.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

2.4.643 TextureNodeValToNor(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeValToNor` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`

- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.644 TextureNodeValToRGB(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeValToRGB` (*TextureNode*)

color_ramp

Type `ColorRamp`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.645 TextureNodeViewer(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

class `bpy.types.TextureNodeViewer` (*TextureNode*)

Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.label`
- `Node.location`
- `Node.outputs`
- `Node.parent`
- `Node.show_texture`
- `TextureNode.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.646 TextureNodes(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TextureNodes` (*bpy_struct*)

Collection of Texture Nodes

new (*type*, *group=None*)

Add a node to this node tree

Parameters

- **type** (*enum in ['OUTPUT', 'CHECKER', 'TEXTURE', 'BRICKS', 'MATH', 'MIX_RGB', 'RGBTOBW', 'VALTORGB', 'IMAGE', 'CURVE_RGB', 'INVERT', 'HUE_SAT', 'CURVE_TIME', 'ROTATE', 'VIEWER', 'TRANSLATE', 'COORD', 'DISTANCE', 'COMPOSE', 'DECOMPOSE', 'VALTONOR', 'SCALE', 'SCRIPT', 'GROUP']*) – Type, Type of node to add
- **group** (`NodeTree`, (optional)) – The group tree

Returns New node

Return type `Node`

remove (*node*)

Remove a node from this node tree

Parameters **node** (`Node`) – The node to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `TextureNodeTree.nodes`

2.4.647 TextureSlot(bpy_struct)

base class — `bpy_struct`

subclasses — `ParticleSettingsTextureSlot`, `MaterialTextureSlot`, `LampTextureSlot`, `BrushTextureSlot`, `WorldTextureSlot`

class `bpy.types.TextureSlot` (*bpy_struct*)

Texture slot defining the mapping and influence of a texture

blend_type

Mode used to apply the texture

Type enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIFFERENCE', 'DIVIDE', 'DARKEN', 'LIGHTEN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT_LIGHT', 'LINEAR_LIGHT'], default 'MIX'

color

Default color for textures that don't return RGB or when RGB to intensity is enabled

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

default_value

Value to use for Ref, Spec, Amb, Emit, Alpha, RayMir, TransLu and Hard

Type float in [-inf, inf], default 0.0

invert

Invert the values of the texture to reverse its effect

Type boolean, default False

name

Texture slot name

Type string, default "", (readonly)

offset

Fine tune of the texture mapping X, Y and Z locations

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

output_node

Which output node to use, for node-based textures

Type enum in ['DUMMY'], default 'DUMMY'

scale

Set scaling for the texture's X, Y and Z sizes

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

texture

Texture datablock used by this texture slot

Type `Texture`

use_rgb_to_intensity

Convert texture RGB values to intensity (gray) values

Type boolean, default False

use_stencil

Use this texture as a blending value on the next texture

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UILayout.template_preview`

2.4.648 Theme(bpy_struct)

base class — `bpy_struct`

class `bpy.types.Theme` (*bpy_struct*)

Theme settings defining draw style and colors in the user interface

bone_color_sets

Type `bpy_prop_collection` of `ThemeBoneColorSet`, (readonly, never None)

clip_editor

Type `ThemeClipEditor`, (readonly, never None)

console

Type `ThemeConsole`, (readonly, never None)

dopesheet_editor

Type `ThemeDopeSheet`, (readonly, never None)

file_browser

Type `ThemeFileBrowser`, (readonly, never None)

graph_editor

Type `ThemeGraphEditor`, (readonly, never None)

image_editor

Type `ThemeImageEditor`, (readonly, never None)

info

Type `ThemeInfo`, (readonly, never None)

logic_editor

Type `ThemeLogicEditor`, (readonly, never None)

name

Name of the theme

Type string, default ""

nla_editor

Type `ThemeNLAEditor`, (readonly, never None)

node_editor

Type `ThemeNodeEditor`, (readonly, never None)

outliner

Type `ThemeOutliner`, (readonly, never None)

properties

Type `ThemeProperties`, (readonly, never None)

sequence_editor

Type `ThemeSequenceEditor`, (readonly, never None)

text_editor

Type `ThemeTextEditor`, (readonly, never None)

theme_area

Type enum in ['USER_INTERFACE', 'BONE_COLOR_SETS', 'VIEW_3D', 'TIMELINE', 'GRAPH_EDITOR', 'DOPE SHEET_EDITOR', 'NLA_EDITOR', 'IMAGE_EDITOR', 'SEQUENCE_EDITOR', 'TEXT_EDITOR', 'NODE_EDITOR', 'LOGIC_EDITOR', 'PROPERTIES', 'OUTLINER', 'USER_PREFERENCES', 'INFO', 'FILE_BROWSER', 'CONSOLE', 'CLIP_EDITOR'], default 'USER_INTERFACE'

timeline

Type `ThemeTimeline`, (readonly, never None)

user_interface

Type `ThemeUserInterface`, (readonly, never None)

user_preferences

Type `ThemeUserPreferences`, (readonly, never None)

view_3d

Type ThemeView3D, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.themes`

2.4.649 ThemeBoneColorSet(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeBoneColorSet` (*bpy_struct*)

Theme settings for bone color sets

active

Color used for active bones

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

normal

Color used for the surface of bones

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

select

Color used for selected bones

Type float array of 3 items in `[-inf, inf]`, default (0.0, 0.0, 0.0)

show_colored_constraints

Allow the use of colors indicating constraints/keyed status

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `BoneGroup.colors`
- `Theme.bone_color_sets`

2.4.650 ThemeClipEditor(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeClipEditor` (*`bpy_struct`*)
Theme settings for the Movie Clip Editor

active_marker

Color of active marker

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

back

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_text

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_text_hi

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

disabled_marker

Color of disabled marker

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex_size

Type int in [0, 255], default 0

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

locked_marker

Color of locked marker

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

marker

Color of marker

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

marker_outline

Color of marker's outline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

path_after

Color of path after current frame

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

path_before

Color of path before current frame

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

selected_marker

Color of selected marker

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.clip_editor`

2.4.651 ThemeConsole(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeConsole` (*bpy_struct*)

Theme settings for the Console

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

cursor

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

line_error

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

line_info

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

line_input

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

line_output

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.console`

2.4.652 ThemeDopeSheet(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeDopeSheet` (*`bpy_struct`*)

Theme settings for the DopeSheet

`active_channels_group`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`back`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`button`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`button_text`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`button_text_hi`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`button_title`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`channel_group`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`channels`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`channels_selected`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

`dopesheet_channel`

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

dopesheet_subchannel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

long_key

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

long_key_selected

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

value_sliders

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

view_sliders

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.dopesheet_editor`

2.4.653 ThemeFileBrowser(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeFileBrowser` (*`bpy_struct`*)

Theme settings for the File Browser

active_file

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

active_file_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scroll_handle

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scrollbar

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

selected_file

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

tiles

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.file_browser`

2.4.654 ThemeFontStyle(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeFontStyle` (*bpy_struct*)

Theme settings for Font

font_kerning_style

Which style to use for font kerning

- `UNFITTED` Unfitted, Use scaled but un-grid-fitted kerning distances.
- `DEFAULT` Default, Use scaled and grid-fitted kerning distances.

Type enum in ['UNFITTED', 'DEFAULT'], default 'UNFITTED'

points

Type int in [6, 48], default 0

shadow

Shadow size in pixels (0, 3 and 5 supported)

Type int in [0, 5], default 0

shadow_offset_x

Shadow offset in pixels

Type int in [-10, 10], default 0

shadow_offset_y

Shadow offset in pixels

Type int in [-10, 10], default 0

shadowalpha**Type** float in [0, 1], default 0.0**shadowcolor**

Shadow color in grey value

Type float in [0, 1], default 0.0**Inherited Properties**

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ThemeStyle.panel_title`
- `ThemeStyle.widget`
- `ThemeStyle.widget_label`

2.4.655 ThemeGraphEditor(`bpy_struct`)base class — `bpy_struct`**class** `bpy.types.ThemeGraphEditor` (*bpy_struct*)

Theme settings for the graph editor

active_channels_group**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**back****Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**button**

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

channel_group

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

channels_region

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

dopesheet_channel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

dopesheet_subchannel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_align

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_auto

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_auto_clamped

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_free

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_align

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_auto

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_auto_clamped

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_free

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_vect

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vect

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vertex_size

Type int in [0, 255], default 0

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

lastsel_point

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

panel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_size

Type int in [1, 10], default 0

window_sliders

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.graph_editor`

2.4.656 ThemeImageEditor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeImageEditor` (*bpy_struct*)

Theme settings for the Image Editor

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

editmesh_active

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

face

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

face_dot

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

face_select

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

facedot_size

Type int in [1, 10], default 0

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scope_back

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_size

Type int in [1, 10], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.image_editor`

2.4.657 ThemeInfo(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeInfo` (*bpy_struct*)

Theme settings for Info

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.info`

2.4.658 ThemeLogicEditor(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeLogicEditor` (*bpy_struct*)

Theme settings for the Logic Editor

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

panel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.logic_editor`

2.4.659 ThemeNLAEditor(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeNLAEditor` (*`bpy_struct`*)

Theme settings for the NLA Editor

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

bars

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

bars_selected

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

strips

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

strips_selected

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

view_sliders

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.nla_editor`

2.4.660 ThemeNodeEditor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeNodeEditor` (*bpy_struct*)

Theme settings for the Node Editor

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

converter_node

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

group_node

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

in_out_node

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

list_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

node_backdrop

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

noodle_curving

Curving of the noodle

Type int in [0, 10], default 5

operator_node

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

selected_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

wire

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

wire_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.node_editor`

2.4.661 ThemeOutliner(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeOutliner` (*bpy_struct*)

Theme settings for the Outliner

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.outliner`

2.4.662 ThemeProperties(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeProperties` (*`bpy_struct`*)

Theme settings for the Properties

back

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_text

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_text_hi

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

button_title

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

header

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

header_text

Type float array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

panel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.properties`

2.4.663 ThemeSequenceEditor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeSequenceEditor` (*bpy_struct*)
Theme settings for the Sequence Editor

audio_strip

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

back
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

draw_action
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

effect_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

image_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

keyframe
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

meta_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

movie_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

plugin_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scene_strip
 Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

transition_strip

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

window_sliders

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.sequence_editor`

2.4.664 ThemeStyle(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeStyle` (*bpy_struct*)

Theme settings for style sets

panel_title

Type ThemeFontStyle, (readonly, never None)

widget

Type ThemeFontStyle, (readonly, never None)

widget_label

Type ThemeFontStyle, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.ui_styles`

2.4.665 ThemeTextEditor(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeTextEditor` (*bpy_struct*)

Theme settings for the Text Editor

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

cursor

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

line_numbers_background

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

scroll_bar

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

selected_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

syntax_builtin

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

syntax_comment

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

syntax_numbers

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

syntax_special

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

syntax_string

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.text_editor`

2.4.666 ThemeTimeline(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeTimeline` (*bpy_struct*)

Theme settings for the Timeline

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.timeline`

2.4.667 ThemeUserInterface(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeUserInterface` (*bpy_struct*)

Theme settings for user interface elements

icon_file

Type string, default ""

wcol_box

Type `ThemeWidgetColors`, (readonly, never None)

wcol_list_item

Type `ThemeWidgetColors`, (readonly, never None)

wcol_menu

Type `ThemeWidgetColors`, (readonly, never None)

wcol_menu_back

Type `ThemeWidgetColors`, (readonly, never None)

wcol_menu_item

Type `ThemeWidgetColors`, (readonly, never None)

wcol_num

Type `ThemeWidgetColors`, (readonly, never None)

wcol_numslider

Type `ThemeWidgetColors`, (readonly, never None)

wcol_option

Type `ThemeWidgetColors`, (readonly, never None)

wcol_progress

Type `ThemeWidgetColors`, (readonly, never None)

wcol_pulldown

Type `ThemeWidgetColors`, (readonly, never None)

wcol_radio

Type `ThemeWidgetColors`, (readonly, never None)

wcol_regular

Type `ThemeWidgetColors`, (readonly, never None)

wcol_scroll

Type `ThemeWidgetColors`, (readonly, never None)

wcol_state

Type `ThemeWidgetStateColors`, (readonly, never None)

wcol_text

Type `ThemeWidgetColors`, (readonly, never None)

wcol_toggle**Type** `ThemeWidgetColors`, (readonly, never None)**wcol_tool****Type** `ThemeWidgetColors`, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.user_interface`

2.4.668 ThemeUserPreferences(bpy_struct)

base class — `bpy_struct`**class** `bpy.types.ThemeUserPreferences` (*bpy_struct*)

Theme settings for the User Preferences

back**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**button****Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**button_text****Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)**button_text_hi**

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.user_preferences`

2.4.669 ThemeView3D(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeView3D` (*bpy_struct*)

Theme settings for the 3D View

act_spline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

back

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

bone_pose

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

bone_solid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

bundle_solid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

button_title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

camera_path

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_crease

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_facesel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_seam

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

edge_sharp

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

editmesh_active

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

extra_edge_len

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

extra_face_angle

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

extra_face_area

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

face

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

face_dot

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

face_select

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

facedot_size

Type int in [1, 10], default 0

frame_current

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

grid

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_align

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_auto

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_free

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_align

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_auto

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_free

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_sel_vect

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

handle_vect

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

header_text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

lamp

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

lastsel_point

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

normal

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

nurb_sel_uline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

nurb_sel_vline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

nurb_uline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

nurb_vline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

object_active

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

object_grouped

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

object_grouped_active

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

object_selected

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

outline_width

Type int in [1, 5], default 0

panel

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

speaker

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_hi

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

title

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

transform

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_normal

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_select

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

vertex_size

Type int in [1, 10], default 0

wire

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Theme.view_3d`

2.4.670 ThemeWidgetColors(bpy_struct)

base class — `bpy_struct`

class `bpy.types.ThemeWidgetColors` (*bpy_struct*)

Theme settings for widget color sets

inner

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

inner_sel

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

item

Type float array of 4 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0)

outline

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

shadedown

Type int in [-100, 100], default 0

shadetop

Type int in [-100, 100], default 0

show_shaded

Type boolean, default False

text

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

text_sel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ThemeUserInterface.wcol_box`
- `ThemeUserInterface.wcol_list_item`
- `ThemeUserInterface.wcol_menu`
- `ThemeUserInterface.wcol_menu_back`
- `ThemeUserInterface.wcol_menu_item`
- `ThemeUserInterface.wcol_num`
- `ThemeUserInterface.wcol_numslider`
- `ThemeUserInterface.wcol_option`
- `ThemeUserInterface.wcol_progress`
- `ThemeUserInterface.wcol_pulldown`
- `ThemeUserInterface.wcol_radio`
- `ThemeUserInterface.wcol_regular`
- `ThemeUserInterface.wcol_scroll`
- `ThemeUserInterface.wcol_text`
- `ThemeUserInterface.wcol_toggle`
- `ThemeUserInterface.wcol_tool`

2.4.671 ThemeWidgetStateColors(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ThemeWidgetStateColors` (*bpy_struct*)

Theme settings for widget state colors

blend

Type float in [0, 1], default 0.0

inner_anim

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

inner_anim_sel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

inner_driven

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

inner_driven_sel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

inner_key

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

inner_key_sel

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ThemeUserInterface.wcol_state`

2.4.672 TimelineMarker(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TimelineMarker` (*bpy_struct*)

Marker for noting points in the timeline

camera

Camera this timeline sets to active

Type `Object`

frame

The frame on which the timeline marker appears

Type `int` in `[-inf, inf]`, default `0`

name

Type `string`, default `""`

select

Marker selection state

Type `boolean`, default `False`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Action.pose_markers`
- `ActionPoseMarkers.active`
- `ActionPoseMarkers.new`
- `ActionPoseMarkers.remove`
- `Scene.timeline_markers`
- `TimelineMarkers.new`
- `TimelineMarkers.remove`

2.4.673 TimelineMarkers(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.TimelineMarkers` (`bpy_struct`)

Collection of timeline markers

new (*name*)

Add a keyframe to the curve

Parameters **name** (*string*) – New name for the marker (not unique)

Returns Newly created timeline marker

Return type `TimelineMarker`

remove (*marker*)

Remove a timeline marker

Parameters **marker** (`TimelineMarker`, (never `None`)) – Timeline marker to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.timeline_markers`

2.4.674 Timer(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Timer` (*bpy_struct*)
Window event timer

time_delta

Time since last step in seconds

Type float in [-inf, inf], default 0.0, (readonly)

time_duration

Time since last step in seconds

Type float in [-inf, inf], default 0.0, (readonly)

time_step

Type float in [-inf, inf], default 0.0, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `WindowManager.event_timer_add`
- `WindowManager.event_timer_remove`

2.4.675 ToolSettings(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.ToolSettings` (*`bpy_struct`*)

`auto_keying_mode`

Mode of automatic keyframe insertion for Objects and Bones

Type enum in [`'ADD_REPLACE_KEYS'`, `'REPLACE_KEYS'`], default `'ADD_REPLACE_KEYS'`

`edge_path_live_unwrap`

Changing edges seam re-calculates UV unwrap

Type boolean, default `False`

`edge_path_mode`

The edge flag to tag when selecting the shortest path

Type enum in [`'SELECT'`, `'SEAM'`, `'SHARP'`, `'CREASE'`, `'BEVEL'`], default `'SELECT'`

`etch_adaptive_limit`

Number of bones in the subdivided stroke

Type float in [`1e-05`, `1`], default `0.0`

`etch_convert_mode`

Method used to convert stroke to bones

- `FIXED` Fixed, Subdivide stroke in fixed number of bones.
- `LENGTH` Length, Subdivide stroke in bones of specific length.

- ADAPTIVE Adaptive, Subdivide stroke adaptively, with more subdivision in curvier parts.
- RETARGET Retarget, Retarget template bone chain to stroke.

Type enum in ['FIXED', 'LENGTH', 'ADAPTIVE', 'RETARGET'], default 'FIXED'

etch_length_limit

Number of bones in the subdivided stroke

Type float in [1e-05, 100000], default 0.0

etch_number

DOC BROKEN

Type string, default ""

etch_roll_mode

Method used to adjust the roll of bones when retargeting

- NONE None, Don't adjust roll.
- VIEW View, Roll bones to face the view.
- JOINT Joint, Roll bone to original joint plane offset.

Type enum in ['NONE', 'VIEW', 'JOINT'], default 'NONE'

etch_side

DOC BROKEN

Type string, default ""

etch_subdivision_number

Number of bones in the subdivided stroke

Type int in [1, 255], default 0

etch_template

Template armature that will be retargeted to the stroke

Type [Object](#)

image_paint

Type [ImagePaint](#), (readonly)

mesh_select_mode

Which mesh elements selection works on

Type boolean array of 3 items, default (False, False, False)

normal_size

Display size for normals in the 3D view

Type float in [1e-05, 1000], default 0.0

particle_edit

Type [ParticleEdit](#), (readonly)

proportional_edit

Proportional Editing mode, allows transforms with distance fall-off

- DISABLED Disable, Proportional Editing disabled.
- ENABLED Enable, Proportional Editing enabled.

- CONNECTED Connected, Proportional Editing using connected geometry only.

Type enum in ['DISABLED', 'ENABLED', 'CONNECTED'], default 'DISABLED'

proportional_edit_falloff

Falloff type for proportional editing mode

- SMOOTH Smooth, Smooth falloff.
- SPHERE Sphere, Spherical falloff.
- ROOT Root, Root falloff.
- SHARP Sharp, Sharp falloff.
- LINEAR Linear, Linear falloff.
- CONSTANT Constant, Constant falloff.
- RANDOM Random, Random falloff.

Type enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], default 'SMOOTH'

proportional_size

Display size for proportional editing circle

Type float in [1e-05, 5000], default 0.0

sculpt

Type `Sculpt`, (readonly)

sculpt_paint_use_unified_size

Instead of per brush radius, the radius is shared across brushes

Type boolean, default False

sculpt_paint_use_unified_strength

Instead of per brush strength, the strength is shared across brushes

Type boolean, default False

show_uv_local_view

Draw only faces with the currently displayed image assigned

Type boolean, default False

snap_element

Type of element to snap to

- INCREMENT Increment, Snap to increments of grid.
- VERTEX Vertex, Snap to vertices.
- EDGE Edge, Snap to edges.
- FACE Face, Snap to faces.
- VOLUME Volume, Snap to volume.

Type enum in ['INCREMENT', 'VERTEX', 'EDGE', 'FACE', 'VOLUME'], default 'INCREMENT'

snap_target

Which part to snap onto the target

- CLOSEST Closest, Snap closest point onto target.
- CENTER Center, Snap center onto target.
- MEDIAN Median, Snap median onto target.
- ACTIVE Active, Snap active onto target.

Type enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], default 'CLOSEST'

use_auto_normalize

Ensure all bone-deforming vertex groups add up to 1.0 while weight painting

Type boolean, default False

use_bone_sketching

DOC BROKEN

Type boolean, default False

use_etch_autoname

DOC BROKEN

Type boolean, default False

use_etch_overdraw

DOC BROKEN

Type boolean, default False

use_etch_quick

DOC BROKEN

Type boolean, default False

use_grease_pencil_sessions

Allow drawing multiple strokes at a time with Grease Pencil

Type boolean, default False

use_keyframe_insert_auto

Automatic keyframe insertion for Objects and Bones

Type boolean, default False

use_keyframe_insert_keyingset

Automatic keyframe insertion using active Keying Set only

Type boolean, default False

use_mesh_automerge

Automatically merge vertices moved to the same location

Type boolean, default False

use_multipaint

Paint across all selected bones while weight painting

Type boolean, default False

use_proportional_edit_objects

Proportional editing object mode

Type boolean, default False

use_record_with_nla

Add a new NLA Track + Strip for every loop/pass made over the animation to allow non-destructive tweaking

Type boolean, default False

use_snap

Snap during transform

Type boolean, default False

use_snap_align_rotation

Align rotation with the snapping target

Type boolean, default False

use_snap_peel_object

Consider objects as whole when finding volume center

Type boolean, default False

use_snap_project

Project individual elements on the surface of other objects

Type boolean, default False

use_snap_self

Snap onto itself (editmode)

Type boolean, default False

use_uv_select_sync

Keep UV and edit mode mesh selection in sync

Type boolean, default False

uv_select_mode

UV selection and display mode

- VERTEX Vertex, Vertex selection mode.
- EDGE Edge, Edge selection mode.
- FACE Face, Face selection mode.
- ISLAND Island, Island selection mode.

Type enum in ['VERTEX', 'EDGE', 'FACE', 'ISLAND'], default 'VERTEX'

vertex_group_weight

Weight to assign in vertex groups

Type float in [0, 1], default 0.0

vertex_paint

Type `VertexPaint`, (readonly)

weight_paint

Type `VertexPaint`, (readonly)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.tool_settings`
- `Scene.tool_settings`

2.4.676 TouchSensor(Sensor)

base classes — `bpy_struct`, `Sensor`

class `bpy.types.TouchSensor` (*Sensor*)
 Sensor to detect objects colliding with the current object

material

Only look for objects with this material (blank = all objects)

Type `Material`

Inherited Properties

- `bpy_struct.id_data`
- `Sensor.name`
- `Sensor.show_expanded`
- `Sensor.frequency`
- `Sensor.invert`
- `Sensor.use_level`
- `Sensor.pin`
- `Sensor.use_pulse_false_level`
- `Sensor.use_pulse_true_level`
- `Sensor.use_tap`

- `Sensor.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sensor.link`
- `Sensor.unlink`

2.4.677 TrackToConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.TrackToConstraint` (*Constraint*)

Aims the constrained object toward the target

head_tail

Target along length of bone: Head=0, Tail=1

Type float in [0, 1], default 0.0

subtarget

Type string, default ""

target

Target Object

Type `Object`

track_axis

Axis that points to the target object

Type enum in ['TRACK_X', 'TRACK_Y', 'TRACK_Z', 'TRACK_NEGATIVE_X', 'TRACK_NEGATIVE_Y', 'TRACK_NEGATIVE_Z'], default 'TRACK_X'

up_axis

Axis that points upward

Type enum in ['UP_X', 'UP_Y', 'UP_Z'], default 'UP_X'

use_target_z

Target's Z axis, not World Z axis, will constraint the Up direction

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`
- `Constraint.is_valid`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.678 TransformConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

class `bpy.types.TransformConstraint` (*Constraint*)
 Maps transformations of the target to the object

from_max_x

Top range of X axis source motion

Type float in [-inf, inf], default 0.0

from_max_y

Top range of Y axis source motion

Type float in [-inf, inf], default 0.0

from_max_z

Top range of Z axis source motion

Type float in [-inf, inf], default 0.0

from_min_x

Bottom range of X axis source motion

Type float in [-inf, inf], default 0.0

from_min_y

Bottom range of Y axis source motion

Type float in [-inf, inf], default 0.0

from_min_z

Bottom range of Z axis source motion

Type float in [-inf, inf], default 0.0

map_from

The transformation type to use from the target

Type enum in ['LOCATION', 'ROTATION', 'SCALE'], default 'LOCATION'

map_to

The transformation type to affect of the constrained object

Type enum in ['LOCATION', 'ROTATION', 'SCALE'], default 'LOCATION'

map_to_x_from

The source axis constrained object's X axis uses

Type enum in ['X', 'Y', 'Z'], default 'X'

map_to_y_from

The source axis constrained object's Y axis uses

Type enum in ['X', 'Y', 'Z'], default 'X'

map_to_z_from

The source axis constrained object's Z axis uses

Type enum in ['X', 'Y', 'Z'], default 'X'

subtarget

Type string, default ""

target

Target Object

Type [Object](#)

to_max_x

Top range of X axis destination motion

Type float in [-inf, inf], default 0.0

to_max_y

Top range of Y axis destination motion

Type float in [-inf, inf], default 0.0

to_max_z

Top range of Z axis destination motion

Type float in [-inf, inf], default 0.0

- to_min_x**
Bottom range of X axis destination motion
Type float in [-inf, inf], default 0.0
- to_min_y**
Bottom range of Y axis destination motion
Type float in [-inf, inf], default 0.0
- to_min_z**
Bottom range of Z axis destination motion
Type float in [-inf, inf], default 0.0
- use_motion_extrapolate**
Extrapolate ranges
Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Constraint.name
- Constraint.active
- Constraint.mute
- Constraint.show_expanded
- Constraint.influence
- Constraint.error_location
- Constraint.owner_space
- Constraint.is_proxy_local
- Constraint.error_rotation
- Constraint.target_space
- Constraint.type
- Constraint.is_valid

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden
- bpy_struct.is_property_set
- bpy_struct.items
- bpy_struct.keyframe_delete
- bpy_struct.keyframe_insert
- bpy_struct.keys
- bpy_struct.path_from_id
- bpy_struct.path_resolve
- bpy_struct.type_recast
- bpy_struct.values

2.4.679 TransformOrientation(bpy_struct)

base class — `bpy_struct`

class `bpy.types.TransformOrientation` (*bpy_struct*)

matrix

Type float array of 9 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.orientations`
- `SpaceView3D.current_orientation`

2.4.680 TransformSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

class `bpy.types.TransformSequence` (*EffectSequence*)
Sequence strip applying affine transformations to other strips

interpolation

- `NONE` None, No interpolation.
- `BILINEAR` Bilinear, Bilinear interpolation.

•BICUBIC Bicubic, Bicubic interpolation.

Type enum in ['NONE', 'BILINEAR', 'BICUBIC'], default 'NONE'

rotation_start

Type float in [-360, 360], default 0.0

scale_start_x

Type float in [0, inf], default 0.0

scale_start_y

Type float in [0, inf], default 0.0

translate_start_x

Type float in [-inf, inf], default 0.0

translate_start_y

Type float in [-inf, inf], default 0.0

translation_unit

Type enum in ['PIXELS', 'PERCENT'], default 'PIXELS'

use_uniform_scale

Scale uniformly, preserving aspect ratio

Type boolean, default False

Inherited Properties

- bpy_struct.id_data
- Sequence.name
- Sequence.blend_type
- Sequence.blend_alpha
- Sequence.channel
- Sequence.waveform
- Sequence.effect_fader
- Sequence.frame_final_end
- Sequence.frame_offset_end
- Sequence.frame_still_end
- Sequence.input_1
- Sequence.input_2
- Sequence.input_3
- Sequence.select_left_handle
- Sequence.frame_final_duration
- Sequence.frame_duration
- Sequence.lock
- Sequence.mute
- Sequence.select_right_handle
- Sequence.select
- Sequence.speed_factor
- Sequence.frame_start
- Sequence.frame_final_start
- Sequence.frame_offset_start

- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`
- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`
- `EffectSequence.strobe`
- `EffectSequence.transform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.681 `UILayout(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.UILayout` (*bpy_struct*)
User interface layout in a panel or header

active

Type boolean, default False

alert

Type boolean, default False

alignment

Type enum in ['EXPAND', 'LEFT', 'CENTER', 'RIGHT'], default 'EXPAND'

enabled

When false, this (sub)layout is greyed out

Type boolean, default False

operator_context

Type enum in ['INVOKE_DEFAULT', 'INVOKE_REGION_WIN', 'INVOKE_REGION_CHANNELS', 'INVOKE_REGION_PREVIEW', 'INVOKE_AREA', 'INVOKE_SCREEN', 'EXEC_DEFAULT', 'EXEC_REGION_WIN', 'EXEC_REGION_CHANNELS', 'EXEC_REGION_PREVIEW', 'EXEC_AREA', 'EXEC_SCREEN'], default 'INVOKE_DEFAULT'

scale_x

Scale factor along the X for items in this (sub)layout

Type float in [0, inf], default 0.0

scale_y

Scale factor along the Y for items in this (sub)layout

Type float in [0, inf], default 0.0

row (*align=False*)

Sub-layout. Items placed in this sublayout are placed next to each other in a row

Parameters **align** (*boolean, (optional)*) – Align buttons to each other

Returns Sub-layout to put items in

Return type `UILayout`

column (*align=False*)

Sub-layout. Items placed in this sublayout are placed under each other in a column

Parameters **align** (*boolean, (optional)*) – Align buttons to each other

Returns Sub-layout to put items in

Return type `UILayout`

column_flow (*columns=0, align=False*)

`column_flow`

Parameters

- **columns** (*int in [0, inf], (optional)*) – Number of columns, 0 is automatic
- **align** (*boolean, (optional)*) – Align buttons to each other

Returns Sub-layout to put items in

Return type `UILayout`

box ()

Sublayout (items placed in this sublayout are placed under each other in a column and are surrounded by a box)

Returns Sub-layout to put items in

Return type `UILayout`

split (*percentage=0.0, align=False*)
split

Parameters

- **percentage** (*float in [0, 1], (optional)*) – Percentage, Percentage of width to split at
- **align** (*boolean, (optional)*) – Align buttons to each other

Returns Sub-layout to put items in

Return type `UILayout`

prop (*data, property, text=""*, *icon='NONE'*, *expand=False, slider=False, toggle=False, icon_only=False, event=False, full_event=False, emboss=True, index=-1*)
Item. Exposes an RNA item and places it into the layout

Parameters

- **data** (`AnyType`, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **text** (*string, (optional)*) – Override automatic text of the item
- **icon** (*enum in ['NONE', 'QUESTION', 'ERROR', 'CANCEL', 'TRIA_RIGHT', 'TRIA_DOWN', 'TRIA_LEFT', 'TRIA_UP', 'ARROW_LEFTRIGHT', 'PLUS', 'DISCLOSURE_TRI_DOWN', 'DISCLOSURE_TRI_RIGHT', 'RADIOBUT_OFF', 'RADIOBUT_ON', 'MENU_PANEL', 'BLENDER', 'DOT', 'X', 'GO_LEFT', 'PLUG', 'UI', 'NODE', 'NODE_SEL', 'FULLSCREEN', 'SPLITSCREEN', 'RIGHTARROW_THIN', 'BORDERMOVE', 'VIEWZOOM', 'ZOOMIN', 'ZOOMOUT', 'PANEL_CLOSE', 'COPY_ID', 'EYEDROPPER', 'LINK_AREA', 'AUTO', 'CHECKBOX_DEHLT', 'CHECKBOX_HLT', 'UNLOCKED', 'LOCKED', 'UNPINNED', 'PINNED', 'SCREEN_BACK', 'RIGHTARROW', 'DOWNARROW_HLT', 'DOTSUP', 'DOTSDOWN', 'LINK', 'INLINK', 'PLUGIN', 'HELP', 'GHOST_ENABLED', 'COLOR', 'LINKED', 'UNLINKED', 'HAND', 'ZOOM_ALL', 'ZOOM_SELECTED', 'ZOOM_PREVIOUS', 'ZOOM_IN', 'ZOOM_OUT', 'RENDER_REGION', 'BORDER_RECT', 'BORDER_LASSO', 'FREEZE', 'STYLUS_PRESSURE', 'GHOST_DISABLED', 'NEW', 'FILE_TICK', 'QUIT', 'URL', 'RECOVER_LAST', 'FULLSCREEN_ENTER', 'FULLSCREEN_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE_SHADED', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'CLIP', 'ASSET_MANAGER', 'OBJECT_DATAMODE', 'EDITMODE_HLT', 'FACESEL_HLT', 'VPAIN_HLT', 'TPAIN_HLT', 'WPAIN_HLT', 'SCULPTMODE_HLT', 'POSE_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'SCENE_DATA', 'RENDERLAYERS', 'WORLD_DATA', 'OBJECT_DATA', 'MESH_DATA', 'CURVE_DATA', 'META_DATA', 'LATTICE_DATA', 'LAMP_DATA', 'MATERIAL_DATA', 'TEXTURE_DATA', 'ANIM_DATA', 'CAMERA_DATA', 'PARTICLE_DATA', 'LIBRARY_DATA_DIRECT', 'GROUP', 'ARMATURE_DATA', 'POSE_DATA', 'BONE_DATA', 'CONSTRAINT', 'SHAPEKEY_DATA', 'CONSTRAINT_BONE', 'PACKAGE', 'UGLYPACKAGE', 'BRUSH_DATA', 'IMAGE_DATA', 'FILE', 'FCURVE', 'FONT_DATA', 'RENDER_RESULT', 'SURFACE_DATA', 'EMPTY_DATA', 'SETTINGS', 'RENDER_ANIMATION', 'RENDER_STILL', 'BOIDS', 'STRANDS', 'LIBRARY_DATA_INDIRECT', 'GREASEPENCIL', 'GROUP_BONE'*)

'GROUP_VERTEX', 'GROUP_VCOL', 'GROUP_UVS', 'RNA', 'RNA_ADD', 'OUTLINER_OB_EMPTY', 'OUTLINER_OB_MESH', 'OUTLINER_OB_CURVE', 'OUTLINER_OB_LATTICE', 'OUTLINER_OB_META', 'OUTLINER_OB_LAMP', 'OUTLINER_OB_CAMERA', 'OUTLINER_OB_ARMATURE', 'OUTLINER_OB_FONT', 'OUTLINER_OB_SURFACE', 'OUTLINER_OB_SPEAKER', 'RESTRICT_VIEW_OFF', 'RESTRICT_VIEW_ON', 'RESTRICT_SELECT_OFF', 'RESTRICT_SELECT_ON', 'RESTRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY', 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUTLINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP', 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE', 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUTLINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE', 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE', 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS', 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI', 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL', 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SURFACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER', 'SURFACE_NSHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE', 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH', 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC', 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES', 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE', 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM', 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS', 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY', 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE', 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP', 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH', 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE', 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY', 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC', 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME', 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT', 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3', 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON', 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON', 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL', 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE', 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF', 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTICLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF', 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX', 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC', 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT', 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTEFLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL', 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT', 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF', 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM', 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE', 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY', 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-

VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH', 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE', 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD', 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR', 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF', 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF', 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW', 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM', 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IMAGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR', 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN', 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE', 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY', 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW', 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK', 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB', 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'EDITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DISCLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC', 'SMALL_TRI_RIGHT_VEC'], (optional)) – Icon, Override automatic icon of the item

- **expand** (*boolean, (optional)*) – Expand button to show more detail
- **slider** (*boolean, (optional)*) – Use slider widget for numeric values
- **toggle** (*boolean, (optional)*) – Use toggle widget for boolean values
- **icon_only** (*boolean, (optional)*) – Draw only icons in buttons, no text
- **event** (*boolean, (optional)*) – Use button to input key events
- **full_event** (*boolean, (optional)*) – Use button to input full events including modifiers
- **emboss** (*boolean, (optional)*) – Draw the button itself, just the icon/text
- **index** (*int in [-2, inf], (optional)*) – The index of this button, when set a single member of an array can be accessed, when set to -1 all array members are used

props_enum (*data, property*)

props_enum

Parameters

- **data** (*AnyType, (never None)*) – Data from which to take property
- **property** (*string*) – Identifier of property in data

prop_menu_enum (*data, property, text="" , icon='NONE'*)

prop_menu_enum

Parameters

- **data** (*AnyType, (never None)*) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **text** (*string, (optional)*) – Override automatic text of the item
- **icon** (*enum in ['NONE', 'QUESTION', 'ERROR', 'CANCEL', 'TRIA_RIGHT', 'TRIA_DOWN', 'TRIA_LEFT', 'TRIA_UP', 'ARROW_LEFTRIGHT', 'PLUS', 'DISCLOSURE_TRI_DOWN', 'DISCLOSURE_TRI_RIGHT', 'RADIOBUT_OFF', 'RADIOBUT_ON', 'MENU_PANEL', 'BLENDER', 'DOT', 'X', 'GO_LEFT', 'PLUG', 'UI', 'NODE', 'NODE_SEL', 'FULLSCREEN', 'SPLITSCREEN', 'RIGHTARROW_THIN',*

'BORDERMOVE', 'VIEWZOOM', 'ZOOMIN', 'ZOOMOUT', 'PANEL_CLOSE',
 'COPY_ID', 'EYEDROPPER', 'LINK_AREA', 'AUTO', 'CHECKBOX_DEHLT',
 'CHECKBOX_HLT', 'UNLOCKED', 'LOCKED', 'UNPINNED', 'PINNED',
 'SCREEN_BACK', 'RIGHTARROW', 'DOWNARROW_HLT', 'DOTSUP', 'DOTSDOWN',
 'LINK', 'INLINK', 'PLUGIN', 'HELP', 'GHOST_ENABLED', 'COLOR', 'LINKED',
 'UNLINKED', 'HAND', 'ZOOM_ALL', 'ZOOM_SELECTED', 'ZOOM_PREVIOUS',
 'ZOOM_IN', 'ZOOM_OUT', 'RENDER_REGION', 'BORDER_RECT', 'BOR-
 DER_LASSO', 'FREEZE', 'STYLUS_PRESSURE', 'GHOST_DISABLED', 'NEW',
 'FILE_TICK', 'QUIT', 'URL', 'RECOVER_LAST', 'FULLSCREEN_ENTER',
 'FULLSCREEN_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM',
 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS',
 'SPEAKER', 'TEXTURE_SHADED', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILE-
 SEL', 'IMAGE_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'AC-
 TION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE',
 'PREFERENCES', 'CLIP', 'ASSET_MANAGER', 'OBJECT_DATAMODE', 'EDIT-
 MODE_HLT', 'FACESEL_HLT', 'VPAINT_HLT', 'TPAINT_HLT', 'WPAINT_HLT',
 'SCULPTMODE_HLT', 'POSE_HLT', 'PARTICLEMODE', 'LIGHTPAINT',
 'SCENE_DATA', 'RENDERLAYERS', 'WORLD_DATA', 'OBJECT_DATA',
 'MESH_DATA', 'CURVE_DATA', 'META_DATA', 'LATTICE_DATA', 'LAMP_DATA',
 'MATERIAL_DATA', 'TEXTURE_DATA', 'ANIM_DATA', 'CAMERA_DATA', 'PAR-
 TICLE_DATA', 'LIBRARY_DATA_DIRECT', 'GROUP', 'ARMATURE_DATA',
 'POSE_DATA', 'BONE_DATA', 'CONSTRAINT', 'SHAPEKEY_DATA', 'CON-
 STRAINT_BONE', 'PACKAGE', 'UGLYPACKAGE', 'BRUSH_DATA', 'IMAGE_DATA',
 'FILE', 'FCURVE', 'FONT_DATA', 'RENDER_RESULT', 'SURFACE_DATA',
 'EMPTY_DATA', 'SETTINGS', 'RENDER_ANIMATION', 'RENDER_STILL', 'BOIDS',
 'STRANDS', 'LIBRARY_DATA_INDIRECT', 'GREASEPENCIL', 'GROUP_BONE',
 'GROUP_VERTEX', 'GROUP_VCOL', 'GROUP_UVS', 'RNA', 'RNA_ADD', 'OUT-
 LINER_OB_EMPTY', 'OUTLINER_OB_MESH', 'OUTLINER_OB_CURVE', 'OUT-
 LINER_OB_LATTICE', 'OUTLINER_OB_META', 'OUTLINER_OB_LAMP', 'OUT-
 LINER_OB_CAMERA', 'OUTLINER_OB_ARMATURE', 'OUTLINER_OB_FONT',
 'OUTLINER_OB_SURFACE', 'OUTLINER_OB_SPEAKER', 'RESTRICT_VIEW_OFF',
 'RESTRICT_VIEW_ON', 'RESTRICT_SELECT_OFF', 'RESTRICT_SELECT_ON', 'RE-
 STRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY',
 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUT-
 LINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP',
 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE',
 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUT-
 LINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE',
 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE',
 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS',
 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI',
 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL',
 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SUR-
 FACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER',
 'SURFACE_NSPPHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE',
 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH',
 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC',
 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES',
 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE',
 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM',
 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS',
 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY',
 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE',
 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP',

'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH',
 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE',
 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY',
 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC',
 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME',
 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT',
 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3',
 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON',
 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON',
 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL',
 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-
 TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE',
 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF',
 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTI-
 CLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF',
 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX',
 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC',
 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT',
 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTE-
 FLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL',
 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT',
 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF',
 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM',
 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE',
 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY',
 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-
 VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH',
 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE',
 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD',
 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR',
 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF',
 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF',
 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW',
 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM',
 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IM-
 AGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR',
 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN',
 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE',
 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY',
 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW',
 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK',
 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB',
 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'ED-
 ITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DIS-
 CLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC',
 'SMALL_TRI_RIGHT_VEC'], (optional) – Icon, Override automatic icon of the item

prop_enum (*data*, *property*, *value*, *text*=" ", *icon*='NONE')

prop_enum

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data

- **value** (*string*) – Enum property value
- **text** (*string, (optional)*) – Override automatic text of the item
- **icon** (*enum in* [`'NONE'`, `'QUESTION'`, `'ERROR'`, `'CANCEL'`, `'TRIA_RIGHT'`, `'TRIA_DOWN'`, `'TRIA_LEFT'`, `'TRIA_UP'`, `'ARROW_LEFTRIGHT'`, `'PLUS'`, `'DISCLOSURE_TRI_DOWN'`, `'DISCLOSURE_TRI_RIGHT'`, `'RADIOBUT_OFF'`, `'RADIOBUT_ON'`, `'MENU_PANEL'`, `'BLENDER'`, `'DOT'`, `'X'`, `'GO_LEFT'`, `'PLUG'`, `'UI'`, `'NODE'`, `'NODE_SEL'`, `'FULLSCREEN'`, `'SPLITSCREEN'`, `'RIGHTARROW_THIN'`, `'BORDERMOVE'`, `'VIEWZOOM'`, `'ZOOMIN'`, `'ZOOMOUT'`, `'PANEL_CLOSE'`, `'COPY_ID'`, `'EYEDROPPER'`, `'LINK_AREA'`, `'AUTO'`, `'CHECKBOX_DEHLT'`, `'CHECKBOX_HLT'`, `'UNLOCKED'`, `'LOCKED'`, `'UNPINNED'`, `'PINNED'`, `'SCREEN_BACK'`, `'RIGHTARROW'`, `'DOWNARROW_HLT'`, `'DOTSUP'`, `'DOTSDOWN'`, `'LINK'`, `'INLINK'`, `'PLUGIN'`, `'HELP'`, `'GHOST_ENABLED'`, `'COLOR'`, `'LINKED'`, `'UNLINKED'`, `'HAND'`, `'ZOOM_ALL'`, `'ZOOM_SELECTED'`, `'ZOOM_PREVIOUS'`, `'ZOOM_IN'`, `'ZOOM_OUT'`, `'RENDER_REGION'`, `'BORDER_RECT'`, `'BORDER_LASSO'`, `'FREEZE'`, `'STYLUS_PRESSURE'`, `'GHOST_DISABLED'`, `'NEW'`, `'FILE_TICK'`, `'QUIT'`, `'URL'`, `'RECOVER_LAST'`, `'FULLSCREEN_ENTER'`, `'FULLSCREEN_EXIT'`, `'BLANK1'`, `'LAMP'`, `'MATERIAL'`, `'TEXTURE'`, `'ANIM'`, `'WORLD'`, `'SCENE'`, `'EDIT'`, `'GAME'`, `'RADIO'`, `'SCRIPT'`, `'PARTICLES'`, `'PHYSICS'`, `'SPEAKER'`, `'TEXTURE_SHADED'`, `'VIEW3D'`, `'IPO'`, `'OOPS'`, `'BUTS'`, `'FILESEL'`, `'IMAGE_COL'`, `'INFO'`, `'SEQUENCE'`, `'TEXT'`, `'IMASEL'`, `'SOUND'`, `'ACTION'`, `'NLA'`, `'SCRIPTWIN'`, `'TIME'`, `'NODETREE'`, `'LOGIC'`, `'CONSOLE'`, `'PREFERENCES'`, `'CLIP'`, `'ASSET_MANAGER'`, `'OBJECT_DATAMODE'`, `'EDITMODE_HLT'`, `'FACESEL_HLT'`, `'VPAINT_HLT'`, `'TPAINT_HLT'`, `'WPAINT_HLT'`, `'SCULPTMODE_HLT'`, `'POSE_HLT'`, `'PARTICLEMODE'`, `'LIGHTPAINT'`, `'SCENE_DATA'`, `'RENDERLAYERS'`, `'WORLD_DATA'`, `'OBJECT_DATA'`, `'MESH_DATA'`, `'CURVE_DATA'`, `'META_DATA'`, `'LATTICE_DATA'`, `'LAMP_DATA'`, `'MATERIAL_DATA'`, `'TEXTURE_DATA'`, `'ANIM_DATA'`, `'CAMERA_DATA'`, `'PARTICLE_DATA'`, `'LIBRARY_DATA_DIRECT'`, `'GROUP'`, `'ARMATURE_DATA'`, `'POSE_DATA'`, `'BONE_DATA'`, `'CONSTRAINT'`, `'SHAPEKEY_DATA'`, `'CONSTRAINT_BONE'`, `'PACKAGE'`, `'UGLYPACKAGE'`, `'BRUSH_DATA'`, `'IMAGE_DATA'`, `'FILE'`, `'FCURVE'`, `'FONT_DATA'`, `'RENDER_RESULT'`, `'SURFACE_DATA'`, `'EMPTY_DATA'`, `'SETTINGS'`, `'RENDER_ANIMATION'`, `'RENDER_STILL'`, `'BOIDS'`, `'STRANDS'`, `'LIBRARY_DATA_INDIRECT'`, `'GREASEPENCIL'`, `'GROUP_BONE'`, `'GROUP_VERTEX'`, `'GROUP_VCOL'`, `'GROUP_UVS'`, `'RNA'`, `'RNA_ADD'`, `'OUTLINER_OB_EMPTY'`, `'OUTLINER_OB_MESH'`, `'OUTLINER_OB_CURVE'`, `'OUTLINER_OB_LATTICE'`, `'OUTLINER_OB_META'`, `'OUTLINER_OB_LAMP'`, `'OUTLINER_OB_CAMERA'`, `'OUTLINER_OB_ARMATURE'`, `'OUTLINER_OB_FONT'`, `'OUTLINER_OB_SURFACE'`, `'OUTLINER_OB_SPEAKER'`, `'RESTRICT_VIEW_OFF'`, `'RESTRICT_VIEW_ON'`, `'RESTRICT_SELECT_OFF'`, `'RESTRICT_SELECT_ON'`, `'RESTRICT_RENDER_OFF'`, `'RESTRICT_RENDER_ON'`, `'OUTLINER_DATA_EMPTY'`, `'OUTLINER_DATA_MESH'`, `'OUTLINER_DATA_CURVE'`, `'OUTLINER_DATA_LATTICE'`, `'OUTLINER_DATA_META'`, `'OUTLINER_DATA_LAMP'`, `'OUTLINER_DATA_CAMERA'`, `'OUTLINER_DATA_ARMATURE'`, `'OUTLINER_DATA_FONT'`, `'OUTLINER_DATA_SURFACE'`, `'OUTLINER_DATA_SPEAKER'`, `'OUTLINER_DATA_POSE'`, `'MESH_PLANE'`, `'MESH_CUBE'`, `'MESH_CIRCLE'`, `'MESH_UVSPHERE'`, `'MESH_ICOSPHERE'`, `'MESH_GRID'`, `'MESH_MONKEY'`, `'MESH_CYLINDER'`, `'MESH_TORUS'`, `'MESH_CONE'`, `'LAMP_POINT'`, `'LAMP_SUN'`, `'LAMP_SPOT'`, `'LAMP_HEMI'`, `'LAMP_AREA'`, `'META_EMPTY'`, `'META_PLANE'`, `'META_CUBE'`, `'META_BALL'`, `'META_ELLIPSOID'`, `'META_CAPSULE'`, `'SURFACE_NCURVE'`, `'SURFACE_NCIRCLE'`, `'SURFACE_NSURFACE'`, `'SURFACE_NCYLINDER'`, `'SURFACE_NSphere'`, `'SURFACE_NTORUS'`, `'CURVE_BEZCURVE'`, `'CURVE_BEZCIRCLE'`, `'CURVE_NCURVE'`, `'CURVE_NCIRCLE'`, `'CURVE_PATH'`,

'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC',
 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES',
 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE',
 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM',
 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS',
 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY',
 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE',
 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP',
 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH',
 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE',
 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY',
 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC',
 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME',
 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT',
 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3',
 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON',
 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON',
 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL',
 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-
 TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE',
 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF',
 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTI-
 CLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF',
 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX',
 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC',
 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT',
 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTE-
 FLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL',
 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT',
 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF',
 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM',
 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE',
 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY',
 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-
 VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH',
 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE',
 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD',
 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR',
 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF',
 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF',
 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW',
 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM',
 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IM-
 AGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR',
 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN',
 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE',
 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY',
 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW',
 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK',
 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB',
 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'ED-
 ITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DIS-
 CLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC',
 'SMALL_TRI_RIGHT_VEC'], (optional) – Icon, Override automatic icon of the item

prop_search (*data, property, search_data, search_property, text=""*, *icon='NONE'*)
 prop_search

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **search_data** (*AnyType*, (never None)) – Data from which to take collection to search in
- **search_property** (*string*) – Identifier of search collection property
- **text** (*string*, (*optional*)) – Override automatic text of the item
- **icon** (*enum in* [*'NONE'*, *'QUESTION'*, *'ERROR'*, *'CANCEL'*, *'TRIA_RIGHT'*, *'TRIA_DOWN'*, *'TRIA_LEFT'*, *'TRIA_UP'*, *'ARROW_LEFTRIGHT'*, *'PLUS'*, *'DISCLOSURE_TRI_DOWN'*, *'DISCLOSURE_TRI_RIGHT'*, *'RADIOBUT_OFF'*, *'RADIOBUT_ON'*, *'MENU_PANEL'*, *'BLENDER'*, *'DOT'*, *'X'*, *'GO_LEFT'*, *'PLUG'*, *'UI'*, *'NODE'*, *'NODE_SEL'*, *'FULLSCREEN'*, *'SPLITSCREEN'*, *'RIGHTARROW_THIN'*, *'BORDERMOVE'*, *'VIEWZOOM'*, *'ZOOMIN'*, *'ZOOMOUT'*, *'PANEL_CLOSE'*, *'COPY_ID'*, *'EYEDROPPER'*, *'LINK_AREA'*, *'AUTO'*, *'CHECKBOX_DEHLT'*, *'CHECKBOX_HLT'*, *'UNLOCKED'*, *'LOCKED'*, *'UNPINNED'*, *'PINNED'*, *'SCREEN_BACK'*, *'RIGHTARROW'*, *'DOWNARROW_HLT'*, *'DOTSUP'*, *'DOTSDOWN'*, *'LINK'*, *'INLINK'*, *'PLUGIN'*, *'HELP'*, *'GHOST_ENABLED'*, *'COLOR'*, *'LINKED'*, *'UNLINKED'*, *'HAND'*, *'ZOOM_ALL'*, *'ZOOM_SELECTED'*, *'ZOOM_PREVIOUS'*, *'ZOOM_IN'*, *'ZOOM_OUT'*, *'RENDER_REGION'*, *'BORDER_RECT'*, *'BORDER_LASSO'*, *'FREEZE'*, *'STYLUS_PRESSURE'*, *'GHOST_DISABLED'*, *'NEW'*, *'FILE_TICK'*, *'QUIT'*, *'URL'*, *'RECOVER_LAST'*, *'FULLSCREEN_ENTER'*, *'FULLSCREEN_EXIT'*, *'BLANK1'*, *'LAMP'*, *'MATERIAL'*, *'TEXTURE'*, *'ANIM'*, *'WORLD'*, *'SCENE'*, *'EDIT'*, *'GAME'*, *'RADIO'*, *'SCRIPT'*, *'PARTICLES'*, *'PHYSICS'*, *'SPEAKER'*, *'TEXTURE_SHADED'*, *'VIEW3D'*, *'IPO'*, *'OOPS'*, *'BUTS'*, *'FILE_SEL'*, *'IMAGE_COL'*, *'INFO'*, *'SEQUENCE'*, *'TEXT'*, *'IMASEL'*, *'SOUND'*, *'ACTION'*, *'NLA'*, *'SCRIPTWIN'*, *'TIME'*, *'NODETREE'*, *'LOGIC'*, *'CONSOLE'*, *'PREFERENCES'*, *'CLIP'*, *'ASSET_MANAGER'*, *'OBJECT_DATAMODE'*, *'EDIT_MODE_HLT'*, *'FACESEL_HLT'*, *'VPAINT_HLT'*, *'TPAINT_HLT'*, *'WPAINT_HLT'*, *'SCULPTMODE_HLT'*, *'POSE_HLT'*, *'PARTICLEMODE'*, *'LIGHTPAINT'*, *'SCENE_DATA'*, *'RENDERLAYERS'*, *'WORLD_DATA'*, *'OBJECT_DATA'*, *'MESH_DATA'*, *'CURVE_DATA'*, *'META_DATA'*, *'LATTICE_DATA'*, *'LAMP_DATA'*, *'MATERIAL_DATA'*, *'TEXTURE_DATA'*, *'ANIM_DATA'*, *'CAMERA_DATA'*, *'PARTICLE_DATA'*, *'LIBRARY_DATA_DIRECT'*, *'GROUP'*, *'ARMATURE_DATA'*, *'POSE_DATA'*, *'BONE_DATA'*, *'CONSTRAINT'*, *'SHAPEKEY_DATA'*, *'CONSTRAINT_BONE'*, *'PACKAGE'*, *'UGLYPACKAGE'*, *'BRUSH_DATA'*, *'IMAGE_DATA'*, *'FILE'*, *'FCURVE'*, *'FONT_DATA'*, *'RENDER_RESULT'*, *'SURFACE_DATA'*, *'EMPTY_DATA'*, *'SETTINGS'*, *'RENDER_ANIMATION'*, *'RENDER_STILL'*, *'BOIDS'*, *'STRANDS'*, *'LIBRARY_DATA_INDIRECT'*, *'GREASEPENCIL'*, *'GROUP_BONE'*, *'GROUP_VERTEX'*, *'GROUP_VCOL'*, *'GROUP_UVS'*, *'RNA'*, *'RNA_ADD'*, *'OUTLINER_OB_EMPTY'*, *'OUTLINER_OB_MESH'*, *'OUTLINER_OB_CURVE'*, *'OUTLINER_OB_LATTICE'*, *'OUTLINER_OB_META'*, *'OUTLINER_OB_LAMP'*, *'OUTLINER_OB_CAMERA'*, *'OUTLINER_OB_ARMATURE'*, *'OUTLINER_OB_FONT'*, *'OUTLINER_OB_SURFACE'*, *'OUTLINER_OB_SPEAKER'*, *'RESTRICT_VIEW_OFF'*, *'RESTRICT_VIEW_ON'*, *'RESTRICT_SELECT_OFF'*, *'RESTRICT_SELECT_ON'*, *'RESTRICT_RENDER_OFF'*, *'RESTRICT_RENDER_ON'*, *'OUTLINER_DATA_EMPTY'*, *'OUTLINER_DATA_MESH'*, *'OUTLINER_DATA_CURVE'*, *'OUTLINER_DATA_LATTICE'*, *'OUTLINER_DATA_META'*, *'OUTLINER_DATA_LAMP'*, *'OUTLINER_DATA_CAMERA'*, *'OUTLINER_DATA_ARMATURE'*, *'OUTLINER_DATA_FONT'*, *'OUTLINER_DATA_SURFACE'*, *'OUT-*

LINER_DATA_SPEAKER, *'OUTLINER_DATA_POSE'*, *'MESH_PLANE'*,
'MESH_CUBE', *'MESH_CIRCLE'*, *'MESH_UVSPHERE'*, *'MESH_ICOSPHERE'*,
'MESH_GRID', *'MESH_MONKEY'*, *'MESH_CYLINDER'*, *'MESH_TORUS'*,
'MESH_CONE', *'LAMP_POINT'*, *'LAMP_SUN'*, *'LAMP_SPOT'*, *'LAMP_HEMI'*,
'LAMP_AREA', *'META_EMPTY'*, *'META_PLANE'*, *'META_CUBE'*, *'META_BALL'*,
'META_ELLIPSOID', *'META_CAPSULE'*, *'SURFACE_NCURVE'*, *'SUR-*
FACE_NCIRCLE', *'SURFACE_NSURFACE'*, *'SURFACE_NCYLINDER'*,
'SURFACE_NSPPHERE', *'SURFACE_NTORUS'*, *'CURVE_BEZCURVE'*,
'CURVE_BEZCIRCLE', *'CURVE_NCURVE'*, *'CURVE_NCIRCLE'*, *'CURVE_PATH'*,
'FORCE_FORCE', *'FORCE_WIND'*, *'FORCE_VORTEX'*, *'FORCE_MAGNETIC'*,
'FORCE_HARMONIC', *'FORCE_CHARGE'*, *'FORCE_LENNARDJONES'*,
'FORCE_TEXTURE', *'FORCE_CURVE'*, *'FORCE_BOID'*, *'FORCE_TURBULENCE'*,
'FORCE_DRAG', *'MODIFIER'*, *'MOD_WAVE'*, *'MOD_BUILD'*, *'MOD_DECIM'*,
'MOD_MIRROR', *'MOD_SOFT'*, *'MOD_SUBSURF'*, *'HOOK'*, *'MOD_PHYSICS'*,
'MOD_PARTICLES', *'MOD_BOOLEAN'*, *'MOD_EDGESPLIT'*, *'MOD_ARRAY'*,
'MOD_UVPROJECT', *'MOD_DISPLACE'*, *'MOD_CURVE'*, *'MOD_LATTICE'*,
'CONSTRAINT_DATA', *'MOD_ARMATURE'*, *'MOD_SHRINKWRAP'*,
'MOD_CAST', *'MOD_MESHDEFORM'*, *'MOD_BEVEL'*, *'MOD_SMOOTH'*,
'MOD_SIMPLEDEFORM', *'MOD_MASK'*, *'MOD_CLOTH'*, *'MOD_EXPLODE'*,
'MOD_FLUIDSIM', *'MOD_MULTIRES'*, *'MOD_SMOKE'*, *'MOD_SOLIDIFY'*,
'MOD_SCREW', *'MOD_VERTEX_WEIGHT'*, *'MOD_DYNAMICPAINT'*, *'REC'*,
'PLAY', *'FF'*, *'REW'*, *'PAUSE'*, *'PREV_KEYFRAME'*, *'NEXT_KEYFRAME'*,
'PLAY_AUDIO', *'PLAY_REVERSE'*, *'PREVIEW_RANGE'*, *'PMARKER_ACT'*,
'PMARKER_SEL', *'PMARKER'*, *'MARKER_HLT'*, *'MARKER'*, *'SPACE2'*, *'SPACE3'*,
'KEYINGSET', *'KEY_DEHLT'*, *'KEY_HLT'*, *'MUTE_IPO_OFF'*, *'MUTE_IPO_ON'*,
'VISIBLE_IPO_OFF', *'VISIBLE_IPO_ON'*, *'DRIVER'*, *'SOLO_OFF'*, *'SOLO_ON'*,
'FRAME_PREV', *'FRAME_NEXT'*, *'VERTEXSEL'*, *'EDGESEL'*, *'FACESEL'*,
'ROTATE', *'CURSOR'*, *'ROTATECOLLECTION'*, *'ROTATECENTER'*, *'RO-*
TACTIVE', *'ALIGN'*, *'SMOOTHCURVE'*, *'SPHERECURVE'*, *'ROOTCURVE'*,
'SHARPCURVE', *'LINCURVE'*, *'NOCURVE'*, *'RNDCURVE'*, *'PROP_OFF'*,
'PROP_ON', *'PROP_CON'*, *'PARTICLE_POINT'*, *'PARTICLE_TIP'*, *'PARTI-*
CLE_PATH', *'MAN_TRANS'*, *'MAN_ROT'*, *'MAN_SCALE'*, *'MANIPUL'*, *'SNAP_OFF'*,
'SNAP_ON', *'SNAP_NORMAL'*, *'SNAP_INCREMENT'*, *'SNAP_VERTEX'*,
'SNAP_EDGE', *'SNAP_FACE'*, *'SNAP_VOLUME'*, *'STICKY_UVS_LOC'*,
'STICKY_UVS_DISABLE', *'STICKY_UVS_VERT'*, *'CLIPUV_DEHLT'*, *'CLIPUV_HLT'*,
'SNAP_PEEL_OBJECT', *'GRID'*, *'PASTEDOWN'*, *'COPYDOWN'*, *'PASTE-*
FLIPUP', *'PASTEFLIPDOWN'*, *'SNAP_SURFACE'*, *'RETOPO'*, *'UV_VERTEXSEL'*,
'UV_EDGESEL', *'UV_FACESEL'*, *'UV_ISLANDSEL'*, *'UV_SYNC_SELECT'*,
'BBOX', *'WIRE'*, *'SOLID'*, *'SMOOTH'*, *'POTATO'*, *'ORTHO'*, *'LOCKVIEW_OFF'*,
'LOCKVIEW_ON', *'AXIS_SIDE'*, *'AXIS_FRONT'*, *'AXIS_TOP'*, *'NDOF_DOM'*,
'NDOF_TURN', *'NDOF_FLY'*, *'NDOF_TRANS'*, *'LAYER_USED'*, *'LAYER_ACTIVE'*,
'SORTALPHA', *'SORTBYEXT'*, *'SORTTIME'*, *'SORTSIZE'*, *'LONGDISPLAY'*,
'SHORTDISPLAY', *'GHOST'*, *'IMGDISPLAY'*, *'BOOKMARKS'*, *'FONTPRE-*
VIEW', *'FILTER'*, *'NEWFOLDER'*, *'FILE_PARENT'*, *'FILE_REFRESH'*,
'FILE_FOLDER', *'FILE_BLANK'*, *'FILE_BLEND'*, *'FILE_IMAGE'*, *'FILE_MOVIE'*,
'FILE_SCRIPT', *'FILE_SOUND'*, *'FILE_FONT'*, *'BACK'*, *'FORWARD'*,
'DISK_DRIVE', *'MATPLANE'*, *'MATSPHERE'*, *'MATCUBE'*, *'MONKEY'*, *'HAIR'*,
'ALIASED', *'ANTIALIASED'*, *'MAT_SPHERE_SKY'*, *'WORDWRAP_OFF'*,
'WORDWRAP_ON', *'SYNTAX_OFF'*, *'SYNTAX_ON'*, *'LINENUMBERS_OFF'*,
'LINENUMBERS_ON', *'SCRIPTPLUGINS'*, *'SEQ_SEQUENCER'*, *'SEQ_PREVIEW'*,
'SEQ_LUMA_WAVEFORM', *'SEQ_CHROMA_SCOPE'*, *'SEQ_HISTOGRAM'*,
'SEQ_SPLITVIEW', *'IMAGE_RGB'*, *'IMAGE_RGB_ALPHA'*, *'IMAGE_ALPHA'*, *'IM-*
AGE_ZDEPTH', *'IMAGEFILE'*, *'BRUSH_ADD'*, *'BRUSH_BLOB'*, *'BRUSH_BLUR'*,
'BRUSH_CLAY', *'BRUSH_CLONE'*, *'BRUSH_CREASE'*, *'BRUSH_DARKEN'*,

‘BRUSH_FILL’, ‘BRUSH_FLATTEN’, ‘BRUSH_GRAB’, ‘BRUSH_INFLATE’, ‘BRUSH_LAYER’, ‘BRUSH_LIGHTEN’, ‘BRUSH_MIX’, ‘BRUSH_MULTIPLY’, ‘BRUSH_NUDGE’, ‘BRUSH_PINCH’, ‘BRUSH_SCRAPE’, ‘BRUSH_SCULPT_DRAW’, ‘BRUSH_SMEAR’, ‘BRUSH_SMOOTH’, ‘BRUSH_SNAKE_HOOK’, ‘BRUSH_SOFTEN’, ‘BRUSH_SUBTRACT’, ‘BRUSH_TEXDRAW’, ‘BRUSH_THUMB’, ‘BRUSH_ROTATE’, ‘BRUSH_VERTEXDRAW’, ‘VIEW3D_VEC’, ‘EDIT_VEC’, ‘EDITMODE_DEHLT’, ‘EDITMODE_HLT’, ‘DISCLOSURE_TRI_RIGHT_VEC’, ‘DISCLOSURE_TRI_DOWN_VEC’, ‘MOVE_UP_VEC’, ‘MOVE_DOWN_VEC’, ‘X_VEC’, ‘SMALL_TRI_RIGHT_VEC’], (optional)) – Icon, Override automatic icon of the item

operator (*operator*, *text*=”“, *icon*=’NONE’, *emboss*=True)

Item. Places a button into the layout to call an Operator

Parameters

- **operator** (*string*) – Identifier of the operator
- **text** (*string*, (optional)) – Override automatic text of the item
- **icon** (*enum in* [’NONE’, ‘QUESTION’, ‘ERROR’, ‘CANCEL’, ‘TRIA_RIGHT’, ‘TRIA_DOWN’, ‘TRIA_LEFT’, ‘TRIA_UP’, ‘ARROW_LEFTRIGHT’, ‘PLUS’, ‘DISCLOSURE_TRI_DOWN’, ‘DISCLOSURE_TRI_RIGHT’, ‘RADIOBUT_OFF’, ‘RADIOBUT_ON’, ‘MENU_PANEL’, ‘BLENDER’, ‘DOT’, ‘X’, ‘GO_LEFT’, ‘PLUG’, ‘UI’, ‘NODE’, ‘NODE_SEL’, ‘FULLSCREEN’, ‘SPLITSCREEN’, ‘RIGHTARROW_THIN’, ‘BORDERMOVE’, ‘VIEWZOOM’, ‘ZOOMIN’, ‘ZOOMOUT’, ‘PANEL_CLOSE’, ‘COPY_ID’, ‘EYEDROPPER’, ‘LINK_AREA’, ‘AUTO’, ‘CHECKBOX_DEHLT’, ‘CHECKBOX_HLT’, ‘UNLOCKED’, ‘LOCKED’, ‘UNPINNED’, ‘PINNED’, ‘SCREEN_BACK’, ‘RIGHTARROW’, ‘DOWNARROW_HLT’, ‘DOTSUP’, ‘DOTSDOWN’, ‘LINK’, ‘INLINK’, ‘PLUGIN’, ‘HELP’, ‘GHOST_ENABLED’, ‘COLOR’, ‘LINKED’, ‘UNLINKED’, ‘HAND’, ‘ZOOM_ALL’, ‘ZOOM_SELECTED’, ‘ZOOM_PREVIOUS’, ‘ZOOM_IN’, ‘ZOOM_OUT’, ‘RENDER_REGION’, ‘BORDER_RECT’, ‘BORDER_LASSO’, ‘FREEZE’, ‘STYLUS_PRESSURE’, ‘GHOST_DISABLED’, ‘NEW’, ‘FILE_TICK’, ‘QUIT’, ‘URL’, ‘RECOVER_LAST’, ‘FULLSCREEN_ENTER’, ‘FULLSCREEN_EXIT’, ‘BLANK1’, ‘LAMP’, ‘MATERIAL’, ‘TEXTURE’, ‘ANIM’, ‘WORLD’, ‘SCENE’, ‘EDIT’, ‘GAME’, ‘RADIO’, ‘SCRIPT’, ‘PARTICLES’, ‘PHYSICS’, ‘SPEAKER’, ‘TEXTURE_SHADED’, ‘VIEW3D’, ‘IPO’, ‘OOPS’, ‘BUTS’, ‘FILE_SEL’, ‘IMAGE_COL’, ‘INFO’, ‘SEQUENCE’, ‘TEXT’, ‘IMASEL’, ‘SOUND’, ‘ACTION’, ‘NLA’, ‘SCRIPTWIN’, ‘TIME’, ‘NODETREE’, ‘LOGIC’, ‘CONSOLE’, ‘PREFERENCES’, ‘CLIP’, ‘ASSET_MANAGER’, ‘OBJECT_DATAMODE’, ‘EDITMODE_HLT’, ‘FACESEL_HLT’, ‘VPAINT_HLT’, ‘TPAINT_HLT’, ‘WPAINT_HLT’, ‘SCULPTMODE_HLT’, ‘POSE_HLT’, ‘PARTICLEMODE’, ‘LIGHTPAINT’, ‘SCENE_DATA’, ‘RENDERLAYERS’, ‘WORLD_DATA’, ‘OBJECT_DATA’, ‘MESH_DATA’, ‘CURVE_DATA’, ‘META_DATA’, ‘LATTICE_DATA’, ‘LAMP_DATA’, ‘MATERIAL_DATA’, ‘TEXTURE_DATA’, ‘ANIM_DATA’, ‘CAMERA_DATA’, ‘PARTICLE_DATA’, ‘LIBRARY_DATA_DIRECT’, ‘GROUP’, ‘ARMATURE_DATA’, ‘POSE_DATA’, ‘BONE_DATA’, ‘CONSTRAINT’, ‘SHAPEKEY_DATA’, ‘CONSTRAINT_BONE’, ‘PACKAGE’, ‘UGLYPACKAGE’, ‘BRUSH_DATA’, ‘IMAGE_DATA’, ‘FILE’, ‘FCURVE’, ‘FONT_DATA’, ‘RENDER_RESULT’, ‘SURFACE_DATA’, ‘EMPTY_DATA’, ‘SETTINGS’, ‘RENDER_ANIMATION’, ‘RENDER_STILL’, ‘BOIDS’, ‘STRANDS’, ‘LIBRARY_DATA_INDIRECT’, ‘GREASEPENCIL’, ‘GROUP_BONE’, ‘GROUP_VERTEX’, ‘GROUP_VCOL’, ‘GROUP_UVS’, ‘RNA’, ‘RNA_ADD’, ‘OUTLINER_OB_EMPTY’, ‘OUTLINER_OB_MESH’, ‘OUTLINER_OB_CURVE’, ‘OUTLINER_OB_LATTICE’, ‘OUTLINER_OB_META’, ‘OUTLINER_OB_LAMP’, ‘OUTLINER_OB_CAMERA’, ‘OUTLINER_OB_ARMATURE’, ‘OUTLINER_OB_FONT’, ‘OUTLINER_OB_SURFACE’, ‘OUTLINER_OB_SPEAKER’, ‘RESTRICT_VIEW_OFF’, ‘RESTRICT_VIEW_ON’, ‘RESTRICT_SELECT_OFF’, ‘RESTRICT_SELECT_ON’, ‘RE-

STRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY',
 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUT-
 LINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP',
 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE',
 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUT-
 LINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE',
 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE',
 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS',
 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI',
 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL',
 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SUR-
 FACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER',
 'SURFACE_NSPPHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE',
 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH',
 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC',
 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES',
 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE',
 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM',
 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS',
 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY',
 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE',
 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP',
 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH',
 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE',
 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY',
 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC',
 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME',
 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT',
 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3',
 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON',
 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON',
 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL',
 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-
 TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE',
 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF',
 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTI-
 CLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF',
 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX',
 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC',
 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT',
 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTE-
 FLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL',
 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT',
 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF',
 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM',
 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE',
 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY',
 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-
 VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH',
 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE',
 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD',
 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR',
 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF',
 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF',

‘LINENUMBERS_ON’, ‘SCRIPTPLUGINS’, ‘SEQ_SEQUENCER’, ‘SEQ_PREVIEW’, ‘SEQ_LUMA_WAVEFORM’, ‘SEQ_CHROMA_SCOPE’, ‘SEQ_HISTOGRAM’, ‘SEQ_SPLITVIEW’, ‘IMAGE_RGB’, ‘IMAGE_RGB_ALPHA’, ‘IMAGE_ALPHA’, ‘IMAGE_ZDEPTH’, ‘IMAGEFILE’, ‘BRUSH_ADD’, ‘BRUSH_BLOB’, ‘BRUSH_BLUR’, ‘BRUSH_CLAY’, ‘BRUSH_CLONE’, ‘BRUSH_CREASE’, ‘BRUSH_DARKEN’, ‘BRUSH_FILL’, ‘BRUSH_FLATTEN’, ‘BRUSH_GRAB’, ‘BRUSH_INFLATE’, ‘BRUSH_LAYER’, ‘BRUSH_LIGHTEN’, ‘BRUSH_MIX’, ‘BRUSH_MULTIPLY’, ‘BRUSH_NUDGE’, ‘BRUSH_PINCH’, ‘BRUSH_SCRAPE’, ‘BRUSH_SCULPT_DRAW’, ‘BRUSH_SMEAR’, ‘BRUSH_SMOOTH’, ‘BRUSH_SNAKE_HOOK’, ‘BRUSH_SOFTEN’, ‘BRUSH_SUBTRACT’, ‘BRUSH_TEXDRAW’, ‘BRUSH_THUMB’, ‘BRUSH_ROTATE’, ‘BRUSH_VERTEXDRAW’, ‘VIEW3D_VEC’, ‘EDIT_VEC’, ‘EDITMODE_DEHLT’, ‘EDITMODE_HLT’, ‘DISCLOSURE_TRI_RIGHT_VEC’, ‘DISCLOSURE_TRI_DOWN_VEC’, ‘MOVE_UP_VEC’, ‘MOVE_DOWN_VEC’, ‘X_VEC’, ‘SMALL_TRI_RIGHT_VEC’], (optional)) – Icon, Override automatic icon of the item

- **emboss** (*boolean, (optional)*) – Draw the button itself, just the icon/text

Returns Operator properties to fill in, return when ‘properties’ is set to true

Return type `OperatorProperties`

operator_enum (*operator, property*)

operator_enum

Parameters

- **operator** (*string*) – Identifier of the operator
- **property** (*string*) – Identifier of property in operator

operator_menu_enum (*operator, property, text=’‘, icon=’NONE’*)

operator_menu_enum

Parameters

- **operator** (*string*) – Identifier of the operator
- **property** (*string*) – Identifier of property in operator
- **text** (*string, (optional)*) – Override automatic text of the item
- **icon** (*enum in [’NONE’, ’QUESTION’, ’ERROR’, ’CANCEL’, ’TRIA_RIGHT’, ’TRIA_DOWN’, ’TRIA_LEFT’, ’TRIA_UP’, ’ARROW_LEFTRIGHT’, ’PLUS’, ’DISCLOSURE_TRI_DOWN’, ’DISCLOSURE_TRI_RIGHT’, ’RADIOBUT_OFF’, ’RADIOBUT_ON’, ’MENU_PANEL’, ’BLENDER’, ’DOT’, ’X’, ’GO_LEFT’, ’PLUG’, ’UI’, ’NODE’, ’NODE_SEL’, ’FULLSCREEN’, ’SPLITSCREEN’, ’RIGHTARROW_THIN’, ’BORDERMOVE’, ’VIEWZOOM’, ’ZOOMIN’, ’ZOOMOUT’, ’PANEL_CLOSE’, ’COPY_ID’, ’EYEDROPPER’, ’LINK_AREA’, ’AUTO’, ’CHECKBOX_DEHLT’, ’CHECKBOX_HLT’, ’UNLOCKED’, ’LOCKED’, ’UNPINNED’, ’PINNED’, ’SCREEN_BACK’, ’RIGHTARROW’, ’DOWNNARROW_HLT’, ’DOTSUP’, ’DOTSDOWN’, ’LINK’, ’INLINK’, ’PLUGIN’, ’HELP’, ’GHOST_ENABLED’, ’COLOR’, ’LINKED’, ’UNLINKED’, ’HAND’, ’ZOOM_ALL’, ’ZOOM_SELECTED’, ’ZOOM_PREVIOUS’, ’ZOOM_IN’, ’ZOOM_OUT’, ’RENDER_REGION’, ’BORDER_RECT’, ’BORDER_LASSO’, ’FREEZE’, ’STYLUS_PRESSURE’, ’GHOST_DISABLED’, ’NEW’, ’FILE_TICK’, ’QUIT’, ’URL’, ’RECOVER_LAST’, ’FULLSCREEN_ENTER’, ’FULLSCREEN_EXIT’, ’BLANK1’, ’LAMP’, ’MATERIAL’, ’TEXTURE’, ’ANIM’, ’WORLD’, ’SCENE’, ’EDIT’, ’GAME’, ’RADIO’, ’SCRIPT’, ’PARTICLES’, ’PHYSICS’, ’SPEAKER’, ’TEXTURE_SHADED’, ’VIEW3D’, ’IPO’, ’OOPS’, ’BUTS’, ’FILE_SEL’, ’IMAGE_COL’, ’INFO’, ’SEQUENCE’, ’TEXT’, ’IMASEL’, ’SOUND’, ’ACTION’, ’NLA’, ’SCRIPTWIN’, ’TIME’, ’NODETREE’, ’LOGIC’, ’CONSOLE’,*

'PREFERENCES', 'CLIP', 'ASSET_MANAGER', 'OBJECT_DATAMODE', 'EDIT-
 MODE_HLT', 'FACESEL_HLT', 'VPAINT_HLT', 'TPAINT_HLT', 'WPAINT_HLT',
 'SCULPTMODE_HLT', 'POSE_HLT', 'PARTICLEMODE', 'LIGHTPAINT',
 'SCENE_DATA', 'RENDERLAYERS', 'WORLD_DATA', 'OBJECT_DATA',
 'MESH_DATA', 'CURVE_DATA', 'META_DATA', 'LATTICE_DATA', 'LAMP_DATA',
 'MATERIAL_DATA', 'TEXTURE_DATA', 'ANIM_DATA', 'CAMERA_DATA', 'PAR-
 TICLE_DATA', 'LIBRARY_DATA_DIRECT', 'GROUP', 'ARMATURE_DATA',
 'POSE_DATA', 'BONE_DATA', 'CONSTRAINT', 'SHAPEKEY_DATA', 'CON-
 STRAINT_BONE', 'PACKAGE', 'UGLYPACKAGE', 'BRUSH_DATA', 'IMAGE_DATA',
 'FILE', 'FCURVE', 'FONT_DATA', 'RENDER_RESULT', 'SURFACE_DATA',
 'EMPTY_DATA', 'SETTINGS', 'RENDER_ANIMATION', 'RENDER_STILL', 'BOIDS',
 'STRANDS', 'LIBRARY_DATA_INDIRECT', 'GREASEPENCIL', 'GROUP_BONE',
 'GROUP_VERTEX', 'GROUP_VCOL', 'GROUP_UVS', 'RNA', 'RNA_ADD', 'OUT-
 LINER_OB_EMPTY', 'OUTLINER_OB_MESH', 'OUTLINER_OB_CURVE', 'OUT-
 LINER_OB_LATTICE', 'OUTLINER_OB_META', 'OUTLINER_OB_LAMP', 'OUT-
 LINER_OB_CAMERA', 'OUTLINER_OB_ARMATURE', 'OUTLINER_OB_FONT',
 'OUTLINER_OB_SURFACE', 'OUTLINER_OB_SPEAKER', 'RESTRICT_VIEW_OFF',
 'RESTRICT_VIEW_ON', 'RESTRICT_SELECT_OFF', 'RESTRICT_SELECT_ON', 'RE-
 STRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY',
 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUT-
 LINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP',
 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE',
 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUT-
 LINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE',
 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE',
 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS',
 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI',
 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL',
 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SUR-
 FACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER',
 'SURFACE_NSPPHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE',
 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH',
 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC',
 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES',
 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE',
 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM',
 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS',
 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY',
 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE',
 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP',
 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH',
 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE',
 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY',
 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC',
 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME',
 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT',
 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3',
 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON',
 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON',
 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL',
 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-
 TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE',
 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF',
 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTI-

'CLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF',
 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX',
 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC',
 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT',
 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTE-
 FLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL',
 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT',
 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF',
 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM',
 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE',
 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY',
 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-
 VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH',
 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE',
 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD',
 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR',
 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF',
 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF',
 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW',
 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM',
 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IM-
 AGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR',
 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN',
 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE',
 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY',
 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW',
 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK',
 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB',
 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'ED-
 ITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DIS-
 CLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC',
 'SMALL_TRI_RIGHT_VEC'], (optional) – Icon, Override automatic icon of the item

label (*text*=" ", *icon*='NONE')

Item. Display text in the layout

Parameters

- **text** (*string*, (optional)) – Override automatic text of the item
- **icon** (*enum in* ['NONE', 'QUESTION', 'ERROR', 'CANCEL', 'TRIA_RIGHT', 'TRIA_DOWN', 'TRIA_LEFT', 'TRIA_UP', 'ARROW_LEFTRIGHT', 'PLUS', 'DISCLOSURE_TRI_DOWN', 'DISCLOSURE_TRI_RIGHT', 'RADIOBUT_OFF', 'RADIOBUT_ON', 'MENU_PANEL', 'BLENDER', 'DOT', 'X', 'GO_LEFT', 'PLUG', 'UI', 'NODE', 'NODE_SEL', 'FULLSCREEN', 'SPLITSCREEN', 'RIGHTARROW_THIN', 'BORDERMOVE', 'VIEWZOOM', 'ZOOMIN', 'ZOOMOUT', 'PANEL_CLOSE', 'COPY_ID', 'EYEDROPPER', 'LINK_AREA', 'AUTO', 'CHECKBOX_DEHLT', 'CHECKBOX_HLT', 'UNLOCKED', 'LOCKED', 'UNPINNED', 'PINNED', 'SCREEN_BACK', 'RIGHTARROW', 'DOWNARROW_HLT', 'DOTSUP', 'DOTSDOWN', 'LINK', 'INLINK', 'PLUGIN', 'HELP', 'GHOST_ENABLED', 'COLOR', 'LINKED', 'UNLINKED', 'HAND', 'ZOOM_ALL', 'ZOOM_SELECTED', 'ZOOM_PREVIOUS', 'ZOOM_IN', 'ZOOM_OUT', 'RENDER_REGION', 'BORDER_RECT', 'BORDER_LASSO', 'FREEZE', 'STYLUS_PRESSURE', 'GHOST_DISABLED', 'NEW', 'FILE_TICK', 'QUIT', 'URL', 'RECOVER_LAST', 'FULLSCREEN_ENTER', 'FULLSCREEN_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS',

'SPEAKER', 'TEXTURE_SHADED', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'CLIP', 'ASSET_MANAGER', 'OBJECT_DATAMODE', 'EDITMODE_HLT', 'FACESEL_HLT', 'VPAINT_HLT', 'TPAINT_HLT', 'WPAINT_HLT', 'SCULPTMODE_HLT', 'POSE_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'SCENE_DATA', 'RENDERLAYERS', 'WORLD_DATA', 'OBJECT_DATA', 'MESH_DATA', 'CURVE_DATA', 'META_DATA', 'LATTICE_DATA', 'LAMP_DATA', 'MATERIAL_DATA', 'TEXTURE_DATA', 'ANIM_DATA', 'CAMERA_DATA', 'PARTICLE_DATA', 'LIBRARY_DATA_DIRECT', 'GROUP', 'ARMATURE_DATA', 'POSE_DATA', 'BONE_DATA', 'CONSTRAINT', 'SHAPEKEY_DATA', 'CONSTRAINT_BONE', 'PACKAGE', 'UGLYPACKAGE', 'BRUSH_DATA', 'IMAGE_DATA', 'FILE', 'FCURVE', 'FONT_DATA', 'RENDER_RESULT', 'SURFACE_DATA', 'EMPTY_DATA', 'SETTINGS', 'RENDER_ANIMATION', 'RENDER_STILL', 'BOIDS', 'STRANDS', 'LIBRARY_DATA_INDIRECT', 'GREASEPENCIL', 'GROUP_BONE', 'GROUP_VERTEX', 'GROUP_VCOL', 'GROUP_UVS', 'RNA', 'RNA_ADD', 'OUTLINER_OB_EMPTY', 'OUTLINER_OB_MESH', 'OUTLINER_OB_CURVE', 'OUTLINER_OB_LATTICE', 'OUTLINER_OB_META', 'OUTLINER_OB_LAMP', 'OUTLINER_OB_CAMERA', 'OUTLINER_OB_ARMATURE', 'OUTLINER_OB_FONT', 'OUTLINER_OB_SURFACE', 'OUTLINER_OB_SPEAKER', 'RESTRICT_VIEW_OFF', 'RESTRICT_VIEW_ON', 'RESTRICT_SELECT_OFF', 'RESTRICT_SELECT_ON', 'RESTRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY', 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUTLINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP', 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE', 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUTLINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE', 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE', 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS', 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI', 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL', 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SURFACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER', 'SURFACE_NSPPHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE', 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH', 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC', 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES', 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE', 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM', 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS', 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY', 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE', 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP', 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH', 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE', 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY', 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC', 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME', 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT', 'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3', 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON', 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON', 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL', 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-

TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE', 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF', 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTICLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF', 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX', 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC', 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT', 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTEFLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL', 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT', 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF', 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM', 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE', 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY', 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPREVIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH', 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE', 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD', 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR', 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF', 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF', 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW', 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM', 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IMAGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR', 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN', 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE', 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY', 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW', 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK', 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB', 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'EDITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DISCLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC', 'SMALL_TRI_RIGHT_VEC'], (optional)) – Icon, Override automatic icon of the item

menu (*menu*, *text*=" ", *icon*='NONE')

menu

Parameters

- **menu** (*string*) – Identifier of the menu
- **text** (*string*, (optional)) – Override automatic text of the item
- **icon** (*enum* in ['NONE', 'QUESTION', 'ERROR', 'CANCEL', 'TRIA_RIGHT', 'TRIA_DOWN', 'TRIA_LEFT', 'TRIA_UP', 'ARROW_LEFTRIGHT', 'PLUS', 'DISCLOSURE_TRI_DOWN', 'DISCLOSURE_TRI_RIGHT', 'RADIOBUT_OFF', 'RADIOBUT_ON', 'MENU_PANEL', 'BLENDER', 'DOT', 'X', 'GO_LEFT', 'PLUG', 'UI', 'NODE', 'NODE_SEL', 'FULLSCREEN', 'SPLITSCREEN', 'RIGHTARROW_THIN', 'BORDERMOVE', 'VIEWZOOM', 'ZOOMIN', 'ZOOMOUT', 'PANEL_CLOSE', 'COPY_ID', 'EYEDROPPER', 'LINK_AREA', 'AUTO', 'CHECKBOX_DEHLT', 'CHECKBOX_HLT', 'UNLOCKED', 'LOCKED', 'UNPINNED', 'PINNED', 'SCREEN_BACK', 'RIGHTARROW', 'DOWNARROW_HLT', 'DOTSUP', 'DOTSDOWN', 'LINK', 'INLINK', 'PLUGIN', 'HELP', 'GHOST_ENABLED', 'COLOR', 'LINKED', 'UNLINKED', 'HAND', 'ZOOM_ALL', 'ZOOM_SELECTED', 'ZOOM_PREVIOUS',

'ZOOM_IN', 'ZOOM_OUT', 'RENDER_REGION', 'BORDER_RECT', 'BORDER_LASSO', 'FREEZE', 'STYLUS_PRESSURE', 'GHOST_DISABLED', 'NEW', 'FILE_TICK', 'QUIT', 'URL', 'RECOVER_LAST', 'FULLSCREEN_ENTER', 'FULLSCREEN_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE_SHADED', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'CLIP', 'ASSET_MANAGER', 'OBJECT_DATAMODE', 'EDIT_MODE_HLT', 'FACESEL_HLT', 'VPAINT_HLT', 'TPAINT_HLT', 'WPAINT_HLT', 'SCULPTMODE_HLT', 'POSE_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'SCENE_DATA', 'RENDERLAYERS', 'WORLD_DATA', 'OBJECT_DATA', 'MESH_DATA', 'CURVE_DATA', 'META_DATA', 'LATTICE_DATA', 'LAMP_DATA', 'MATERIAL_DATA', 'TEXTURE_DATA', 'ANIM_DATA', 'CAMERA_DATA', 'PARTICLE_DATA', 'LIBRARY_DATA_DIRECT', 'GROUP', 'ARMATURE_DATA', 'POSE_DATA', 'BONE_DATA', 'CONSTRAINT', 'SHAPEKEY_DATA', 'CONSTRAINT_BONE', 'PACKAGE', 'UGLYPACKAGE', 'BRUSH_DATA', 'IMAGE_DATA', 'FILE', 'FCURVE', 'FONT_DATA', 'RENDER_RESULT', 'SURFACE_DATA', 'EMPTY_DATA', 'SETTINGS', 'RENDER_ANIMATION', 'RENDER_STILL', 'BOIDS', 'STRANDS', 'LIBRARY_DATA_INDIRECT', 'GREASEPENCIL', 'GROUP_BONE', 'GROUP_VERTEX', 'GROUP_VCOL', 'GROUP_UVS', 'RNA', 'RNA_ADD', 'OUTLINER_OB_EMPTY', 'OUTLINER_OB_MESH', 'OUTLINER_OB_CURVE', 'OUTLINER_OB_LATTICE', 'OUTLINER_OB_META', 'OUTLINER_OB_LAMP', 'OUTLINER_OB_CAMERA', 'OUTLINER_OB_ARMATURE', 'OUTLINER_OB_FONT', 'OUTLINER_OB_SURFACE', 'OUTLINER_OB_SPEAKER', 'RESTRICT_VIEW_OFF', 'RESTRICT_VIEW_ON', 'RESTRICT_SELECT_OFF', 'RESTRICT_SELECT_ON', 'RESTRICT_RENDER_OFF', 'RESTRICT_RENDER_ON', 'OUTLINER_DATA_EMPTY', 'OUTLINER_DATA_MESH', 'OUTLINER_DATA_CURVE', 'OUTLINER_DATA_LATTICE', 'OUTLINER_DATA_META', 'OUTLINER_DATA_LAMP', 'OUTLINER_DATA_CAMERA', 'OUTLINER_DATA_ARMATURE', 'OUTLINER_DATA_FONT', 'OUTLINER_DATA_SURFACE', 'OUTLINER_DATA_SPEAKER', 'OUTLINER_DATA_POSE', 'MESH_PLANE', 'MESH_CUBE', 'MESH_CIRCLE', 'MESH_UVSPHERE', 'MESH_ICOSPHERE', 'MESH_GRID', 'MESH_MONKEY', 'MESH_CYLINDER', 'MESH_TORUS', 'MESH_CONE', 'LAMP_POINT', 'LAMP_SUN', 'LAMP_SPOT', 'LAMP_HEMI', 'LAMP_AREA', 'META_EMPTY', 'META_PLANE', 'META_CUBE', 'META_BALL', 'META_ELLIPSOID', 'META_CAPSULE', 'SURFACE_NCURVE', 'SURFACE_NCIRCLE', 'SURFACE_NSURFACE', 'SURFACE_NCYLINDER', 'SURFACE_NSPPHERE', 'SURFACE_NTORUS', 'CURVE_BEZCURVE', 'CURVE_BEZCIRCLE', 'CURVE_NCURVE', 'CURVE_NCIRCLE', 'CURVE_PATH', 'FORCE_FORCE', 'FORCE_WIND', 'FORCE_VORTEX', 'FORCE_MAGNETIC', 'FORCE_HARMONIC', 'FORCE_CHARGE', 'FORCE_LENNARDJONES', 'FORCE_TEXTURE', 'FORCE_CURVE', 'FORCE_BOID', 'FORCE_TURBULENCE', 'FORCE_DRAG', 'MODIFIER', 'MOD_WAVE', 'MOD_BUILD', 'MOD_DECIM', 'MOD_MIRROR', 'MOD_SOFT', 'MOD_SUBSURF', 'HOOK', 'MOD_PHYSICS', 'MOD_PARTICLES', 'MOD_BOOLEAN', 'MOD_EDGESPLIT', 'MOD_ARRAY', 'MOD_UVPROJECT', 'MOD_DISPLACE', 'MOD_CURVE', 'MOD_LATTICE', 'CONSTRAINT_DATA', 'MOD_ARMATURE', 'MOD_SHRINKWRAP', 'MOD_CAST', 'MOD_MESHDEFORM', 'MOD_BEVEL', 'MOD_SMOOTH', 'MOD_SIMPLEDEFORM', 'MOD_MASK', 'MOD_CLOTH', 'MOD_EXPLODE', 'MOD_FLUIDSIM', 'MOD_MULTIRES', 'MOD_SMOKE', 'MOD_SOLIDIFY', 'MOD_SCREW', 'MOD_VERTEX_WEIGHT', 'MOD_DYNAMICPAINT', 'REC', 'PLAY', 'FF', 'REW', 'PAUSE', 'PREV_KEYFRAME', 'NEXT_KEYFRAME', 'PLAY_AUDIO', 'PLAY_REVERSE', 'PREVIEW_RANGE', 'PMARKER_ACT',

'PMARKER_SEL', 'PMARKER', 'MARKER_HLT', 'MARKER', 'SPACE2', 'SPACE3', 'KEYINGSET', 'KEY_DEHLT', 'KEY_HLT', 'MUTE_IPO_OFF', 'MUTE_IPO_ON', 'VISIBLE_IPO_OFF', 'VISIBLE_IPO_ON', 'DRIVER', 'SOLO_OFF', 'SOLO_ON', 'FRAME_PREV', 'FRAME_NEXT', 'VERTEXSEL', 'EDGESEL', 'FACESEL', 'ROTATE', 'CURSOR', 'ROTATECOLLECTION', 'ROTATECENTER', 'RO-TACTIVE', 'ALIGN', 'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE', 'SHARPCURVE', 'LINCURVE', 'NOCURVE', 'RNDCURVE', 'PROP_OFF', 'PROP_ON', 'PROP_CON', 'PARTICLE_POINT', 'PARTICLE_TIP', 'PARTI-CLE_PATH', 'MAN_TRANS', 'MAN_ROT', 'MAN_SCALE', 'MANIPUL', 'SNAP_OFF', 'SNAP_ON', 'SNAP_NORMAL', 'SNAP_INCREMENT', 'SNAP_VERTEX', 'SNAP_EDGE', 'SNAP_FACE', 'SNAP_VOLUME', 'STICKY_UVS_LOC', 'STICKY_UVS_DISABLE', 'STICKY_UVS_VERT', 'CLIPUV_DEHLT', 'CLIPUV_HLT', 'SNAP_PEEL_OBJECT', 'GRID', 'PASTEDOWN', 'COPYDOWN', 'PASTE-FLIPUP', 'PASTEFLIPDOWN', 'SNAP_SURFACE', 'RETOPO', 'UV_VERTEXSEL', 'UV_EDGESEL', 'UV_FACESEL', 'UV_ISLANDSEL', 'UV_SYNC_SELECT', 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'ORTHO', 'LOCKVIEW_OFF', 'LOCKVIEW_ON', 'AXIS_SIDE', 'AXIS_FRONT', 'AXIS_TOP', 'NDOF_DOM', 'NDOF_TURN', 'NDOF_FLY', 'NDOF_TRANS', 'LAYER_USED', 'LAYER_ACTIVE', 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY', 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BOOKMARKS', 'FONTPRE-VIEW', 'FILTER', 'NEWFOLDER', 'FILE_PARENT', 'FILE_REFRESH', 'FILE_FOLDER', 'FILE_BLANK', 'FILE_BLEND', 'FILE_IMAGE', 'FILE_MOVIE', 'FILE_SCRIPT', 'FILE_SOUND', 'FILE_FONT', 'BACK', 'FORWARD', 'DISK_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR', 'ALIASED', 'ANTIALIASED', 'MAT_SPHERE_SKY', 'WORDWRAP_OFF', 'WORDWRAP_ON', 'SYNTAX_OFF', 'SYNTAX_ON', 'LINENUMBERS_OFF', 'LINENUMBERS_ON', 'SCRIPTPLUGINS', 'SEQ_SEQUENCER', 'SEQ_PREVIEW', 'SEQ_LUMA_WAVEFORM', 'SEQ_CHROMA_SCOPE', 'SEQ_HISTOGRAM', 'SEQ_SPLITVIEW', 'IMAGE_RGB', 'IMAGE_RGB_ALPHA', 'IMAGE_ALPHA', 'IM-AGE_ZDEPTH', 'IMAGEFILE', 'BRUSH_ADD', 'BRUSH_BLOB', 'BRUSH_BLUR', 'BRUSH_CLAY', 'BRUSH_CLONE', 'BRUSH_CREASE', 'BRUSH_DARKEN', 'BRUSH_FILL', 'BRUSH_FLATTEN', 'BRUSH_GRAB', 'BRUSH_INFLATE', 'BRUSH_LAYER', 'BRUSH_LIGHTEN', 'BRUSH_MIX', 'BRUSH_MULTIPLY', 'BRUSH_NUDGE', 'BRUSH_PINCH', 'BRUSH_SCRAPE', 'BRUSH_SCULPT_DRAW', 'BRUSH_SMEAR', 'BRUSH_SMOOTH', 'BRUSH_SNAKE_HOOK', 'BRUSH_SOFTEN', 'BRUSH_SUBTRACT', 'BRUSH_TEXDRAW', 'BRUSH_THUMB', 'BRUSH_ROTATE', 'BRUSH_VERTEXDRAW', 'VIEW3D_VEC', 'EDIT_VEC', 'ED-ITMODE_DEHLT', 'EDITMODE_HLT', 'DISCLOSURE_TRI_RIGHT_VEC', 'DIS-CLOSURE_TRI_DOWN_VEC', 'MOVE_UP_VEC', 'MOVE_DOWN_VEC', 'X_VEC', 'SMALL_TRI_RIGHT_VEC'], (optional)) – Icon, Override automatic icon of the item

separator ()

Item. Inserts empty space into the layout between items

context_pointer_set (*name, data*)

context_pointer_set

Parameters

- **name** (*string*) – Name, Name of entry in the context
- **data** (*AnyType*) – Pointer to put in context

template_header (*menus=True*)

template_header

Parameters **menus** (*boolean, (optional)*) – The header has menus, and should show menu ex-

pander

template_ID (*data, property, new=""*, *open=""*, *unlink=""*)
template_ID

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **new** (*string, (optional)*) – Operator identifier to create a new ID block
- **open** (*string, (optional)*) – Operator identifier to open a file for creating a new ID block
- **unlink** (*string, (optional)*) – Operator identifier to unlink the ID block

template_ID_preview (*data, property, new=""*, *open=""*, *unlink=""*, *rows=0, cols=0*)
template_ID_preview

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **new** (*string, (optional)*) – Operator identifier to create a new ID block
- **open** (*string, (optional)*) – Operator identifier to open a file for creating a new ID block
- **unlink** (*string, (optional)*) – Operator identifier to unlink the ID block
- **rows** (*int in [0, inf], (optional)*) – Number of thumbnail preview rows to display
- **cols** (*int in [0, inf], (optional)*) – Number of thumbnail preview columns to display

template_any_ID (*data, property, type_property, text=""*)
template_any_ID

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **type_property** (*string*) – Identifier of property in data giving the type of the ID-blocks to use
- **text** (*string, (optional)*) – Custom label to display in UI

template_path_builder (*data, property, root, text=""*)
template_path_builder

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **root** (*ID*) – ID-block from which path is evaluated from
- **text** (*string, (optional)*) – Custom label to display in UI

template_modifier (*data*)
Layout . Generates the UI layout for modifiers

Parameters **data** (*Modifier*, (never None)) – Modifier data

Returns Sub-layout to put items in

Return type `UILayout`

template_constraint (*data*)

Layout . Generates the UI layout for constraints

Parameters *data* (`Constraint`, (never None)) – Constraint data

Returns Sub-layout to put items in

Return type `UILayout`

template_preview (*id*, *show_buttons=True*, *parent=None*, *slot=None*)

Item. A preview window for materials, textures, lamps, etc.

Parameters

- **id** (`ID`) – ID datablock
- **show_buttons** (*boolean*, (*optional*)) – Show preview buttons?
- **parent** (`ID`, (*optional*)) – ID datablock
- **slot** (`TextureSlot`, (*optional*)) – Texture slot

template_curve_mapping (*data*, *property*, *type='NONE'*, *levels=False*, *brush=False*)

Item. A curve mapping widget used for e.g falloff curves for lamps

Parameters

- **data** (`AnyType`, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **type** (*enum in ['NONE', 'VECTOR', 'COLOR']*, (*optional*)) – Type, Type of curves to display
- **levels** (*boolean*, (*optional*)) – Show black/white levels
- **brush** (*boolean*, (*optional*)) – Show brush options

template_color_ramp (*data*, *property*, *expand=False*)

Item. A color ramp widget

Parameters

- **data** (`AnyType`, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **expand** (*boolean*, (*optional*)) – Expand button to show more detail

template_histogram (*data*, *property*)

Item. A histogram widget to analyze image data

Parameters

- **data** (`AnyType`, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data

template_waveform (*data*, *property*)

Item. A waveform widget to analyze image data

Parameters

- **data** (`AnyType`, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data

template_vectorscope (*data, property*)

Item. A vectorscope widget to analyze imaga data

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data

template_layers (*data, property, used_layers_data, used_layers_property, active_layer*)

template_layers

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **used_layers_data** (*AnyType*) – Data from which to take property
- **used_layers_property** (*string*) – Identifier of property in data
- **active_layer** (*int in [0, inf]*) – Active Layer

template_color_wheel (*data, property, value_slider=False, lock=False, lock_luminosity=False, cubic=True*)

Item. A color wheel widget to pick colors

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **value_slider** (*boolean, (optional)*) – Display the value slider to the right of the color wheel
- **lock** (*boolean, (optional)*) – Lock the color wheel display to value 1.0 regardless of actual color
- **lock_luminosity** (*boolean, (optional)*) – Keep the color at its original vector length
- **cubic** (*boolean, (optional)*) – Cubic saturation for picking values close to white

template_image_layers (*image, image_user*)

template_image_layers

template_image (*data, property, image_user, compact=False*)

Item(s). User interface for selecting images and their source paths

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **compact** (*boolean, (optional)*) – Use more compact layout

template_movieclip (*data, property, compact=False*)

Item(s). User interface for selecting movie clips and their source paths

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **compact** (*boolean, (optional)*) – Use more compact layout

template_track (*data, property*)

Item. A movie-track widget to preview tracking image.

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data

template_marker (*data, property, clip_user, track, compact=False*)

Item. A widget to control single marker settings.

Parameters

- **data** (*AnyType*, (never None)) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **compact** (*boolean*, (*optional*)) – Use more compact layout

template_list (*data, property, active_data, active_property, prop_list=""*, *rows=5, maxrows=5, type='DEFAULT'*)

Item. A list widget to display data. e.g. vertexgroups

Parameters

- **data** (*AnyType*) – Data from which to take property
- **property** (*string*) – Identifier of property in data
- **active_data** (*AnyType*, (never None)) – Data from which to take property for the active element
- **active_property** (*string*) – Identifier of property in data, for the active element
- **prop_list** (*string*, (*optional*)) – Identifier of a string property in each data member, specifying which of its properties should have a widget displayed in its row (format: “propname1:propname2:propname3:...”)
- **rows** (*int in [0, inf]*, (*optional*)) – Number of rows to display
- **maxrows** (*int in [0, inf]*, (*optional*)) – Maximum number of rows to display
- **type** (*enum in ['DEFAULT', 'COMPACT', 'ICONS']*, (*optional*)) – Type, Type of list to use

template_running_jobs ()

template_running_jobs

template_operator_search ()

template_operator_search

template_header_3D ()

template_header_3D

template_edit_mode_selection ()

template_edit_mode_selection

template_reports_banner ()

template_reports_banner

template_node_link (*ntree, node, socket*)

template_node_link

template_node_view (*ntree, node, socket*)
template_node_view

template_texture_user ()
template_texture_user

template_keymap_item_properties (*item*)
template_keymap_item_properties

introspect ()
introspect

Returns Descr, DESCR

Return type string

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Header.layout`
- `Menu.layout`
- `Operator.layout`
- `Panel.layout`
- `UILayout.box`
- `UILayout.column`
- `UILayout.column_flow`
- `UILayout.row`
- `UILayout.split`
- `UILayout.template_constraint`

- `UILayout.template_modifier`

2.4.682 UVProjectModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.UVProjectModifier` (*Modifier*)

UV projection modifier to sets UVs from a projector

aspect_x

Type float in [1, inf], default 0.0

aspect_y

Type float in [1, inf], default 0.0

image

Type `Image`

projector_count

Number of projectors to use

Type int in [1, 10], default 0

projectors

Type `bpy_prop_collection` of `UVProjector`, (readonly)

scale_x

Type float in [0, inf], default 0.0

scale_y

Type float in [0, inf], default 0.0

use_image_override

Override faces' current images with the given image

Type boolean, default False

uv_layer

UV layer name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.683 UVProjector(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.UVProjector` (*bpy_struct*)
UV projector used by the UV project modifier

object

Object to use as projector transform

Type `Object`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `UVProjectModifier.projectors`

2.4.684 UVTextures(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.UVTextures` (*bpy_struct*)
Collection of uv textures

active

Active UV texture

Type `MeshTextureFaceLayer`

active_index

Active UV texture index

Type `int` in `[0, inf]`, default `0`

new (*name="UVTex"*)

Add a UV texture layer to Mesh

Parameters **name** (*string, (optional)*) – UV Texture name

Returns The newly created layer

Return type `MeshTextureFaceLayer`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.uv_textures`

2.4.685 UnitSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UnitSettings` (*bpy_struct*)

scale_length

Scale to use when converting between blender units and dimensions

Type float in [1e-05, 100000], default 0.0

system

The unit system to use for button display

Type enum in ['NONE', 'METRIC', 'IMPERIAL'], default 'NONE'

system_rotation

Unit to use for displaying/editing rotation values

- DEGREES Degrees, Use degrees for measuring angles and rotations.
- RADIANS Radians.

Type enum in ['DEGREES', 'RADIANS'], default 'DEGREES'

use_separate

Display units in pairs

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Scene.unit_settings`

2.4.686 UnknownType(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UnknownType` (*bpy_struct*)
Stub RNA type used for pointers to unknown or internal data

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ShapeKey.data`
- `SpaceSequenceEditor.grease_pencil`

2.4.687 UserPreferences(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserPreferences` (*bpy_struct*)
Global user preferences

active_section

Active section of the user preferences shown in the user interface

Type enum in ['INTERFACE', 'EDITING', 'INPUT', 'ADDONS', 'THEMES', 'FILES', 'SYSTEM'], default 'INTERFACE'

addons

Type Addons bpy_prop_collection of Addon, (readonly)

edit

Settings for interacting with Blender data

Type UserPreferencesEdit, (readonly, never None)

filepaths

Default paths for external files

Type UserPreferencesFilePaths, (readonly, never None)

inputs

Settings for input devices

Type UserPreferencesInput, (readonly, never None)

system

Graphics driver and operating system settings

Type UserPreferencesSystem, (readonly, never None)

themes

Type bpy_prop_collection of Theme, (readonly)

ui_styles

Type bpy_prop_collection of ThemeStyle, (readonly)

view

Preferences related to viewing data

Type UserPreferencesView, (readonly, never None)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.user_preferences`

2.4.688 UserPreferencesEdit(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserPreferencesEdit` (*bpy_struct*)

Settings for interacting with Blender data

auto_keying_mode

Mode of automatic keyframe insertion for Objects and Bones (default setting used for new Scenes)

Type enum in ['ADD_REPLACE_KEYS', 'REPLACE_KEYS'], default 'ADD_REPLACE_KEYS'

grease_pencil_eraser_radius

Radius of eraser 'brush'

Type int in [0, 100], default 0

grease_pencil_euclidean_distance

Distance moved by mouse when drawing stroke (in pixels) to include

Type int in [0, 100], default 0

grease_pencil_manhattan_distance

Pixels moved by mouse per axis when drawing stroke

Type int in [0, 100], default 0

keyframe_new_handle_type

Handle type for handles of new keyframes

- FREE Free.
- VECTOR Vector.
- ALIGNED Aligned.
- AUTO Automatic.
- AUTO_CLAMPED Auto Clamped, Auto handles clamped to not overshoot.

Type enum in ['FREE', 'VECTOR', 'ALIGNED', 'AUTO', 'AUTO_CLAMPED'], default 'FREE'

keyframe_new_interpolation_type

Interpolation mode used for first keyframe on newly added F-Curves (subsequent keyframes take interpolation from preceding keyframe)

Type enum in ['CONSTANT', 'LINEAR', 'BEZIER'], default 'CONSTANT'

material_link

Toggle whether the material is linked to object data or the object block

- OBDATA ObData, Toggle whether the material is linked to object data or the object block.
- OBJECT Object, Toggle whether the material is linked to object data or the object block.

Type enum in ['OBDATA', 'OBJECT'], default 'OBDATA'

object_align

When adding objects from a 3D View menu, either align them with that view or with the world

- WORLD World, Align newly added objects to the world coordinate system.
- VIEW View, Align newly added objects facing the active 3D View direction.

Type enum in ['WORLD', 'VIEW'], default 'WORLD'

sculpt_paint_overlay_color

Color of texture overlay

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

undo_memory_limit

Maximum memory usage in megabytes (0 means unlimited)

Type int in [0, 32767], default 0

undo_steps

Number of undo steps available (smaller values conserve memory)

Type int in [0, 64], default 0

use_auto_keying

Automatic keyframe insertion for Objects and Bones (default setting used for new Scenes)

Type boolean, default False

use_drag_immediately

Moving things with a mouse drag confirms when releasing the button

Type boolean, default False

use_duplicate_action

Causes actions to be duplicated with the object

Type boolean, default False

use_duplicate_armature

Causes armature data to be duplicated with the object

Type boolean, default False

use_duplicate_curve

Causes curve data to be duplicated with the object

Type boolean, default False

use_duplicate_fcurve

Causes F-curve data to be duplicated with the object

Type boolean, default False

use_duplicate_lamp

Causes lamp data to be duplicated with the object

Type boolean, default False

use_duplicate_material

Causes material data to be duplicated with the object

Type boolean, default False

use_duplicate_mesh

Causes mesh data to be duplicated with the object

Type boolean, default False

use_duplicate_metaball

Causes metaball data to be duplicated with the object

Type boolean, default False

use_duplicate_particle

Causes particle systems to be duplicated with the object

Type boolean, default False

use_duplicate_surface

Causes surface data to be duplicated with the object

Type boolean, default False

use_duplicate_text

Causes text data to be duplicated with the object

Type boolean, default False

use_duplicate_texture

Causes texture data to be duplicated with the object

Type boolean, default False

use_enter_edit_mode

Enter Edit Mode automatically after adding a new object

Type boolean, default False

use_global_undo

Global undo works by keeping a full copy of the file itself in memory, so takes extra memory

Type boolean, default False

use_grease_pencil_simplify_stroke

Simplify the final stroke

Type boolean, default False

use_grease_pencil_smooth_stroke

Smooth the final stroke

Type boolean, default False

use_insertkey_xyz_to_rgb

Color for newly added transformation F-Curves (Location, Rotation, Scale) and also Color is based on the transform axis

Type boolean, default False

use_keyframe_insert_available

Automatic keyframe insertion in available F-Curves

Type boolean, default False

use_keyframe_insert_needed

Keyframe insertion only when keyframe needed

Type boolean, default False

use_negative_frames

Current frame number can be manually set to a negative value

Type boolean, default False

use_visual_keying

Use Visual keying automatically for constrained objects

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.edit`

2.4.689 UserPreferencesFilePaths(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserPreferencesFilePaths` (*bpy_struct*)

Default paths for external files

animation_player

Path to a custom animation/frame sequence player

Type string, default ""

animation_player_preset

Preset configs for external animation players

- BLENDER24 Blender 2.4, Blender command line animation playback - path to Blender 2.4.
- DJV Djv, Open source frame player: <http://djv.sourceforge.net>.
- FRAMECYCLER FrameCycler, Frame player from IRIDAS.
- RV rv, Frame player from Tweak Software.
- MPLAYER MPlayer, Media player for video & png/jpeg/sgi image sequences.
- CUSTOM Custom, Custom animation player executable path.

Type enum in ['BLENDER24', 'DJV', 'FRAMECYCLER', 'RV', 'MPLAYER', 'CUSTOM'], default 'BLENDER24'

auto_save_time

The time (in minutes) to wait between automatic temporary saves

Type int in [1, 60], default 0

font_directory

The default directory to search for loading fonts

Type string, default ""

hide_recent_locations

Hide recent locations in the file selector

Type boolean, default False

image_editor

Path to an image editor

Type string, default ""

recent_files

Maximum number of recently opened files to remember

Type int in [0, 30], default 0

render_output_directory

The default directory for rendering output, for new scenes

Type string, default ""

save_version

The number of old versions to maintain in the current directory, when manually saving

Type int in [0, 32], default 0

script_directory

Alternate script path, matching the default layout with subdirs: startup, addons & modules (requires restart)

Type string, default ""

sequence_plugin_directory

The default directory to search for sequence plugins

Type string, default ""

show_hidden_files_datablocks

Hide files/datablocks that start with a dot (.*)

Type boolean, default False

show_thumbnails

Open in thumbnail view for images and movies

Type boolean, default False

sound_directory

The default directory to search for sounds

Type string, default ""

temporary_directory

The directory for storing temporary save files

Type string, default ""

texture_directory

The default directory to search for textures

Type string, default ""

texture_plugin_directory

The default directory to search for texture plugins

Type string, default ""

use_auto_save_temporary_files

Automatic saving of temporary files in temp directory, uses process ID

Type boolean, default False

use_file_compression

Enable file compression when saving .blend files

Type boolean, default False

use_filter_files

Display only files with extensions in the image select window

Type boolean, default False

use_load_ui

Load user interface setup when loading .blend files

Type boolean, default False

use_relative_paths

Default relative path option for the file selector

Type boolean, default False

use_save_preview_images

Enables automatic saving of preview images in the .blend file

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.filepaths`

2.4.690 UserPreferencesInput(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserPreferencesInput` (*bpy_struct*)

Settings for input devices

active_keyconfig

The name of the active key configuration

Type string, default ""

drag_threshold

Amount of pixels you have to drag before dragging UI items happens

Type int in [3, 40], default 0

invert_mouse_zoom

Invert the axis of mouse movement for zooming

Type boolean, default False

invert_zoom_wheel

Swap the Mouse Wheel zoom direction

Type boolean, default False

mouse_double_click_time

Time/delay (in ms) for a double click

Type int in [1, 1000], default 0

ndof_fly_helicopter

Device up/down directly controls your Z position

Type boolean, default False

ndof_lock_horizon

Keep horizon level while flying with 3D Mouse

Type boolean, default False

ndof_panz_invert_axis

Invert x axis

Type boolean, default False

ndof_pany_invert_axis

Invert y axis

Type boolean, default False

ndof_panz_invert_axis

Invert z axis

Type boolean, default False

ndof_roll_invert_axis

Invert roll axis

Type boolean, default False

ndof_rotate_invert_axis

Invert rotation axis

Type boolean, default False

ndof_sensitivity

Overall sensitivity of the 3D Mouse

Type float in [0.25, 4], default 0.0

ndof_show_guide

Display the center and axis during rotation

Type boolean, default False

ndof_tilt_invert_axis

Invert tilt axis

Type boolean, default False

ndof_zoom_invert

Zoom using opposite direction

Type boolean, default False

ndof_zoom_updown

Zoom using up/down on the device (otherwise forward/backward)

Type boolean, default False

select_mouse

Mouse button used for selection

- LEFT Left, Use left Mouse Button for selection.
- RIGHT Right, Use Right Mouse Button for selection.

Type enum in ['LEFT', 'RIGHT'], default 'RIGHT'

use_emulate_numpad

Main 1 to 0 keys act as the numpad ones (useful for laptops)

Type boolean, default False

use_mouse_continuous

Allow moving the mouse outside the view on some manipulations (transform, ui control drag)

Type boolean, default False

use_mouse_emulate_3_button

Emulate Middle Mouse with Alt+Left Mouse (doesn't work with Left Mouse Select option)

Type boolean, default False

use_mouse_mmb_paste

In text window, paste with middle mouse button instead of panning

Type boolean, default False

view_rotate_method

Rotation style in the viewport

- TURNTABLE Turntable, Use turntable style rotation in the viewport.
- TRACKBALL Trackball, Use trackball style rotation in the viewport.

Type enum in ['TURNTABLE', 'TRACKBALL'], default 'TURNTABLE'

view_zoom_axis

Axis of mouse movement to zoom in or out on

- VERTICAL Vertical, Zoom in and out based on vertical mouse movement.
- HORIZONTAL Horizontal, Zoom in and out based on horizontal mouse movement.

Type enum in ['VERTICAL', 'HORIZONTAL'], default 'VERTICAL'

view_zoom_method

Which style to use for viewport scaling

- CONTINUE Continue, Old style zoom, continues while moving mouse up or down.
- DOLLY Dolly, Zoom in and out based on vertical mouse movement.
- SCALE Scale, Zoom in and out like scaling the view, mouse movements relative to center.

Type enum in ['CONTINUE', 'DOLLY', 'SCALE'], default 'CONTINUE'

wheel_scroll_lines

Number of lines scrolled at a time with the mouse wheel

Type int in [0, 32], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.inputs`

2.4.691 UserPreferencesSystem(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserPreferencesSystem` (*bpy_struct*)

Graphics driver and operating system settings

anisotropic_filter

Quality of the anisotropic filtering (values greater than 1.0 enable anisotropic filtering)

Type enum in ['FILTER_0', 'FILTER_2', 'FILTER_4', 'FILTER_8', 'FILTER_16'], default 'FILTER_0'

audio_channels

Audio channel count

- **MONO** Mono, Set audio channels to mono.
- **STEREO** Stereo, Set audio channels to stereo.
- **SURROUND4** 4 Channels, Set audio channels to 4 channels.
- **SURROUND51** 5.1 Surround, Set audio channels to 5.1 surround sound.
- **SURROUND71** 7.1 Surround, Set audio channels to 7.1 surround sound.

Type enum in ['MONO', 'STEREO', 'SURROUND4', 'SURROUND51', 'SURROUND71'], default 'MONO'

audio_device

Audio output device

- **NONE** None, Null device - there will be no audio output.

Type enum in ['NONE'], default 'NONE'

audio_mixing_buffer

Number of samples used by the audio mixing buffer

- SAMPLES_256 256, Set audio mixing buffer size to 256 samples.
- SAMPLES_512 512, Set audio mixing buffer size to 512 samples.
- SAMPLES_1024 1024, Set audio mixing buffer size to 1024 samples.
- SAMPLES_2048 2048, Set audio mixing buffer size to 2048 samples.
- SAMPLES_4096 4096, Set audio mixing buffer size to 4096 samples.
- SAMPLES_8192 8192, Set audio mixing buffer size to 8192 samples.
- SAMPLES_16384 16384, Set audio mixing buffer size to 16384 samples.
- SAMPLES_32768 32768, Set audio mixing buffer size to 32768 samples.

Type enum in ['SAMPLES_256', 'SAMPLES_512', 'SAMPLES_1024', 'SAMPLES_2048', 'SAMPLES_4096', 'SAMPLES_8192', 'SAMPLES_16384', 'SAMPLES_32768'], default 'SAMPLES_256'

audio_sample_format

Audio sample format

- U8 8-bit Unsigned, Set audio sample format to 8 bit unsigned integer.
- S16 16-bit Signed, Set audio sample format to 16 bit signed integer.
- S24 24-bit Signed, Set audio sample format to 24 bit signed integer.
- S32 32-bit Signed, Set audio sample format to 32 bit signed integer.
- FLOAT 32-bit Float, Set audio sample format to 32 bit float.
- DOUBLE 64-bit Float, Set audio sample format to 64 bit float.

Type enum in ['U8', 'S16', 'S24', 'S32', 'FLOAT', 'DOUBLE'], default 'U8'

audio_sample_rate

Audio sample rate

- RATE_44100 44.1 kHz, Set audio sampling rate to 44100 samples per second.
- RATE_48000 48 kHz, Set audio sampling rate to 48000 samples per second.
- RATE_96000 96 kHz, Set audio sampling rate to 96000 samples per second.
- RATE_192000 192 kHz, Set audio sampling rate to 192000 samples per second.

Type enum in ['RATE_44100', 'RATE_48000', 'RATE_96000', 'RATE_192000'], default 'RATE_44100'

author

Name that will be used in exported files when format supports such feature

Type string, default ""

color_picker_type

Different styles of displaying the color picker widget

- CIRCLE Circle, A circular Hue/Saturation color wheel, with Value slider.
- SQUARE_SV Square (SV + H), A square showing Saturation/Value, with Hue slider.
- SQUARE_HS Square (HS + V), A square showing Hue/Saturation, with Value slider.
- SQUARE_HV Square (HV + S), A square showing Hue/Value, with Saturation slider.

Type enum in ['CIRCLE', 'SQUARE_SV', 'SQUARE_HS', 'SQUARE_HV'], default 'CIRCLE'

dpi

Font size and resolution for display

Type int in [48, 128], default 0

frame_server_port

Frameserver Port for Frameserver Rendering

Type int in [0, 32727], default 0

gl_clip_alpha

Clip alpha below this threshold in the 3D textured view

Type float in [0, 1], default 0.0

gl_texture_limit

Limit the texture size to save graphics memory

Type enum in ['CLAMP_OFF', 'CLAMP_8192', 'CLAMP_4096', 'CLAMP_2048', 'CLAMP_1024', 'CLAMP_512', 'CLAMP_256', 'CLAMP_128'], default 'CLAMP_OFF'

language

Language used for translation

- DEFAULT Default (Default).
- ENGLISH English (English), en_US.
- FRENCH French (Français), fr_FR.
- ITALIAN Italian (Italiano), it_IT.
- RUSSIAN Russian (), ru_RU.
- SIMPLIFIED_CHINESE Simplified Chinese (), zh_CN.
- SPANISH Spanish (Español), es_ES.
- JAPANESE Japanese (), ja_JP.
- DUTCH Dutch (Nederlandse taal), nl_NL.
- GERMAN German (Deutsch), de_DE.
- FINNISH Finnish (Suomi), fi_FI.
- SWEDISH Swedish (Svenska), sv_SE.
- CATALAN Catalan (Català), ca_AD.
- CZECH Czech (Český), cs_CZ.
- BRAZILIAN_PORTUGUESE Brazilian Portuguese (Português do Brasil), pt_BR.
- TRADITIONAL_CHINESE Traditional Chinese (), zh_TW.
- CROATIAN Croatian (Hrvatski), hr_HR.

- SERBIAN Serbian (), sr_RS.
- UKRAINIAN Ukrainian (), uk_UA.
- POLISH Polish (Polski), pl_PL.
- ROMANIAN Romanian (Român), ro_RO.
- ARABIC Arabic (), ar_EG.
- BULGARIAN Bulgarian (), bg_BG.
- GREEK Greek (Ελληνική), el_GR.
- KOREAN Korean (), ko_KR.
- PERSIAN Persian (), fa_PE.
- INDONESIAN Indonesian (Bahasa indonesia), id_ID.

Type enum in ['DEFAULT', 'ENGLISH', 'FRENCH', 'ITALIAN', 'RUSSIAN', 'SIMPLIFIED_CHINESE', 'SPANISH', 'JAPANESE', 'DUTCH', 'GERMAN', 'FINNISH', 'SWEDISH', 'CATALAN', 'CZECH', 'BRAZILIAN_PORTUGUESE', 'TRADITIONAL_CHINESE', 'CROATIAN', 'SERBIAN', 'UKRAINIAN', 'POLISH', 'ROMANIAN', 'ARABIC', 'BULGARIAN', 'GREEK', 'KOREAN', 'PERSIAN', 'INDONESIAN'], default 'DEFAULT'

memory_cache_limit

Memory cache limit in sequencer (megabytes)

Type int in [0, 16384], default 0

prefetch_frames

Number of frames to render ahead during playback

Type int in [0, 500], default 0

screencast_fps

Frame rate for the screencast to be played back

Type int in [10, 50], default 0

screencast_wait_time

Time in milliseconds between each frame recorded for screencast

Type int in [50, 1000], default 0

scrollback

Maximum number of lines to store for the console buffer

Type int in [32, 32768], default 0

solid_lights

Lights user to display objects in solid draw mode

Type bpy_prop_collection of UserSolidLight, (readonly)

texture_collection_rate

Number of seconds between each run of the GL texture garbage collector

Type int in [1, 3600], default 0

texture_time_out

Time since last access of a GL texture in seconds after which it is freed (set to 0 to keep textures allocated)

Type int in [0, 3600], default 0

use_antialiasing

Use anti-aliasing for the 3D view (may impact redraw performance)

Type boolean, default False

use_international_fonts

Use international fonts

Type boolean, default False

use_mipmaps

Scale textures for the 3D View (looks nicer but uses more memory and slows image reloading)

Type boolean, default False

use_preview_images

Allow user to choose any codec (Windows only, might generate instability)

Type boolean, default False

use_scripts_auto_execute

Allow any .blend file to run scripts automatically (unsafe with blend files from an untrusted source)

Type boolean, default False

use_tabs_as_spaces

Automatically convert all new tabs into spaces for new and loaded text files

Type boolean, default False

use_text_antialiasing

Draw user interface text anti-aliased

Type boolean, default False

use_textured_fonts

Use textures for drawing international fonts

Type boolean, default False

use_translate_interface

Translate Interface

Type boolean, default False

use_translate_tooltips

Translate Tooltips

Type boolean, default False

use_vertex_buffer_objects

Use Vertex Buffer Objects (or Vertex Arrays, if unsupported) for viewport rendering

Type boolean, default False

use_weight_color_range

Enable color range used for weight visualization in weight painting mode

Type boolean, default False

weight_color_range

Color range used for weight visualization in weight painting mode

Type `ColorRamp`, (readonly, never None)

window_draw_method

Drawing method used by the window manager

- AUTOMATIC** Automatic, Automatically set based on graphics card and driver.
- TRIPLE_BUFFER** Triple Buffer, Use a third buffer for minimal redraws at the cost of more memory.
- OVERLAP** Overlap, Redraw all overlapping regions, minimal memory usage but more redraws.
- OVERLAP_FLIP** Overlap Flip, Redraw all overlapping regions, minimal memory usage but more redraws (for graphics drivers that do flipping).
- FULL** Full, Do a full redraw each time, slow, only use for reference or when everything else fails.

Type enum in ['AUTOMATIC', 'TRIPLE_BUFFER', 'OVERLAP', 'OVERLAP_FLIP', 'FULL'], default 'TRIPLE_BUFFER'

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.system`

2.4.692 `UserPreferencesView(bpy_struct)`

base class — `bpy_struct`

class `bpy.types.UserPreferencesView` (*bpy_struct*)
Preferences related to viewing data

`manipulator_handle_size`

Size of widget handles as percentage of widget radius

Type int in [2, 40], default 25

manipulator_hotspot

Pixel distance around the handles to accept mouse clicks

Type int in [4, 40], default 14

manipulator_size

Diameter of widget, in 10 pixel units

Type int in [2, 40], default 15

mini_axis_brightness

Brightness of the icon

Type int in [0, 10], default 0

mini_axis_size

The axes icon's size

Type int in [10, 64], default 0

object_origin_size

Diameter in Pixels for Object/Lamp origin display

Type int in [4, 10], default 0

open_left_mouse_delay

Time in 1/10 seconds to hold the Left Mouse Button before opening the toolbox

Type int in [1, 40], default 0

open_right_mouse_delay

Time in 1/10 seconds to hold the Right Mouse Button before opening the toolbox

Type int in [1, 40], default 0

open_sublevel_delay

Time delay in 1/10 seconds before automatically opening sub level menus

Type int in [1, 40], default 0

open_toplevel_delay

Time delay in 1/10 seconds before automatically opening top level menus

Type int in [1, 40], default 0

rotation_angle

Rotation step for numerical pad keys (2 4 6 8)

Type int in [0, 90], default 0

show_column_layout

Use a column layout for toolbox

Type boolean, default False

show_large_cursors

Use large mouse cursors when available

Type boolean, default False

show_manipulator

Use 3D transform manipulator

Type boolean, default False

show_mini_axis

Show a small rotating 3D axes in the bottom left corner of the 3D View

Type boolean, default False

show_object_info

Display objects name and frame number in 3D view

Type boolean, default False

show_playback_fps

Show the frames per second screen refresh rate, while animation is played back

Type boolean, default False

show_splash

Display splash screen on startup

Type boolean, default False

show_tooltips

Display tooltips

Type boolean, default False

show_tooltips_python

Show Python references in tooltips

Type boolean, default False

show_view_name

Show the name of the view's direction in each 3D View

Type boolean, default False

smooth_view

Time to animate the view in milliseconds, zero to disable

Type int in [0, 1000], default 0

timecode_style

Format of Time Codes displayed when not displaying timing in terms of frames

- MINIMAL** Minimal Info, Most compact representation, uses '+' as separator for sub-second frame numbers, with left and right truncation of the timecode as necessary.
- SMPTE** SMPTE (Full), Full SMPTE timecode (format is HH:MM:SS:FF).
- SMPTE_COMPACT** SMPTE (Compact), SMPTE timecode showing minutes, seconds, and frames only - hours are also shown if necessary, but not by default.
- MILLISECONDS** Compact with Milliseconds, Similar to SMPTE (Compact), except that instead of frames, milliseconds are shown instead.
- SECONDS_ONLY** Only Seconds, Direct conversion of frame numbers to seconds.

Type enum in ['MINIMAL', 'SMPTE', 'SMPTE_COMPACT', 'MILLISECONDS', 'SECONDS_ONLY'], default 'MINIMAL'

use_auto_perspective

Automatically switch between orthographic and perspective when changing from top/front/side views

Type boolean, default False

use_camera_lock_parent

When the camera is locked to the view and in fly mode, transform the parent rather than the camera

Type boolean, default False

use_directional_menus

Otherwise menus, etc will always be top to bottom, left to right, no matter opening direction

Type boolean, default False

use_global_pivot

Lock the same rotation/scaling pivot in all 3D Views

Type boolean, default False

use_global_scene

Force the current Scene to be displayed in all Screens

Type boolean, default False

use_mouse_auto_depth

Use the depth under the mouse to improve view pan/rotate/zoom functionality

Type boolean, default False

use_mouse_over_open

Open menu buttons and pulldowns automatically when the mouse is hovering

Type boolean, default False

use_rotate_around_active

Use selection as the pivot point

Type boolean, default False

use_zoom_to_mouse

Zoom in towards the mouse pointer's position in the 3D view, rather than the 2D window center

Type boolean, default False

view2d_grid_spacing_min

Minimum number of pixels between each gridline in 2D Viewports

Type int in [1, 500], default 0

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`

- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `UserPreferences.view`

2.4.693 UserSolidLight(bpy_struct)

base class — `bpy_struct`

class `bpy.types.UserSolidLight` (*bpy_struct*)

Light used for OpenGL lighting in solid draw mode

diffuse_color

Diffuse color of the OpenGL light

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

direction

Direction that the OpenGL light is shining

Type float array of 3 items in [-inf, inf], default (0.0, 1.0, 0.0)

specular_color

Color of the light's specular highlight

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

use

Enable this OpenGL light in solid draw mode

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

References

- `UserPreferencesSystem.solid_lights`

2.4.694 VectorFont(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.VectorFont` (*ID*)
Vector font for Text objects

filepath

Type string, default "", (readonly)

packed_file

Type `PackedFile`, (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`

- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.fonts`
- `BlendDataFonts.load`
- `BlendDataFonts.remove`
- `TextCurve.font`
- `TextCurve.font_bold`
- `TextCurve.font_bold_italic`
- `TextCurve.font_italic`

2.4.695 VertexColors(bpy_struct)

base class — `bpy_struct`

class `bpy.types.VertexColors` (*bpy_struct*)

Collection of vertex colors

active

Active vertex color layer

Type `MeshColorLayer`

active_index

Active vertex color index

Type `int` in `[0, inf]`, default `0`

new (*name="Col"*)

Add a vertex color layer to Mesh

Parameters **name** (*string, optional*) – Vertex color name

Returns The newly created layer

Return type `MeshColorLayer`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Mesh.vertex_colors`

2.4.696 VertexGroup(bpy_struct)

base class — `bpy_struct`

class `bpy.types.VertexGroup` (*bpy_struct*)

Group of vertices, used for armature deform and other purposes

index

Index number of the vertex group

Type `int` in `[0, inf]`, default `0`, (readonly)

lock_weight

Maintain the relative weights for the group

Type `boolean`, default `False`

name

Vertex group name

Type `string`, default `""`

add (*index, weight, type*)

Add vertices to the group

Parameters

- **index** (*int array of 1 items in `[-inf, inf]`*) – Index List
- **weight** (*float in `[0, 1]`*) – Vertex weight
- **type** (*enum in `['REPLACE', 'ADD', 'SUBTRACT']`*) – Vertex assign mode
 - `REPLACE` Replace, Replace.
 - `ADD` Add, Add.
 - `SUBTRACT` Subtract, Subtract.

remove (*index*)

Remove a vertex from the group

Parameters **index** (*int array of 1 items in `[-inf, inf]`*) – Index List

weight (*index*)

Get a vertex weight from the group

Parameters **index** (*int in `[0, inf]`*) – Index, The index of the vertex

Returns Vertex weight

Return type `float` in `[0, 1]`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.vertex_groups`
- `VertexGroups.active`
- `VertexGroups.new`
- `VertexGroups.remove`

2.4.697 VertexGroupElement(bpy_struct)

base class — `bpy_struct`

class `bpy.types.VertexGroupElement` (*bpy_struct*)

Weight value of a vertex in a vertex group

group

Type `int` in `[0, inf]`, default `0`, (readonly)

weight

Vertex Weight

Type `float` in `[0, 1]`, default `0.0`

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `LatticePoint.groups`
- `MeshVertex.groups`

2.4.698 VertexGroups(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.VertexGroups` (*bpy_struct*)

Collection of vertex groups

active

Vertex groups of the object

Type `VertexGroup`, (readonly)

active_index

Active index in vertex group array

Type `int` in `[-32768, 32767]`, default 0

new (*name="Group"*)

Add vertex group to object

Parameters **name** (*string, (optional)*) – Vertex group name

Returns New vertex group

Return type `VertexGroup`

remove (*group*)

Delete vertex group from object

Parameters **group** (`VertexGroup`, (never `None`)) – Vertex group to remove

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Object.vertex_groups`

2.4.699 VertexPaint(Paint)

base classes — `bpy_struct`, `Paint`

class `bpy.types.VertexPaint` (*Paint*)

Properties of vertex and weight paint mode

use_all_faces

Paint on all faces inside brush

Type boolean, default False

use_normal

Applies the vertex normal before painting

Type boolean, default False

use_spray

Keep applying paint effect while holding mouse

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Paint.brush`

- `Paint.show_low_resolution`
- `Paint.show_brush`
- `Paint.show_brush_on_surface`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `ToolSettings.vertex_paint`
- `ToolSettings.weight_paint`

2.4.700 VertexWeightEditModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.VertexWeightEditModifier` (*Modifier*)

Edit the weights of vertices in a group

add_threshold

Lower bound for a vertex's weight to be added to the vgroup

Type float in [0, 1], default 0.0

default_weight

Default weight a vertex will have if it is not in the vgroup

Type float in [0, 1], default 0.0

falloff_type

How weights are mapped to there new values

Type enum in ['LINEAR', 'CURVE', 'SHARP', 'SMOOTH', 'ROOT', 'ICON_SPHERECURVE', 'RANDOM', 'STEP'], default 'LINEAR'

map_curve

Custom mapping curve

Type `CurveMapping`, (readonly)

mask_constant

Global influence of current modifications on vgroup

Type float in [-inf, inf], default 0.0

mask_tex_map_object

Which object to take texture coordinates from

Type Object

mask_tex_mapping

Which texture coordinates to use for mapping

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

mask_tex_use_channel

Which texture channel to use for masking

Type enum in ['INT', 'RED', 'GREEN', 'BLUE', 'HUE', 'SAT', 'VAL', 'ALPHA'], default 'INT'

mask_tex_uv_layer

UV layer name

Type string, default ""

mask_texture

Masking texture

Type Texture

mask_vertex_group

Masking vertex group name

Type string, default ""

remove_threshold

Upper bound for a vertex's weight to be removed from the vgroup

Type float in [0, 1], default 0.0

use_add

Add vertices with weight over threshold to vgroup

Type boolean, default False

use_remove

Remove vertices with weight below threshold from vgroup

Type boolean, default False

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`

- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.701 VertexWeightMixModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.VertexWeightMixModifier` (*Modifier*)

Mix the weights of two vertex groups

default_weight_a

Default weight a vertex will have if it is not in the first vgroup

Type float in [0, 1], default 0.0

default_weight_b

Default weight a vertex will have if it is not in the second vgroup

Type float in [0, 1], default 0.0

mask_constant

Global influence of current modifications on vgroup

Type float in [-inf, inf], default 0.0

mask_tex_map_object

Which object to take texture coordinates from

Type `Object`

mask_tex_mapping

Which texture coordinates to use for mapping

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

mask_tex_use_channel

Which texture channel to use for masking

Type enum in ['INT', 'RED', 'GREEN', 'BLUE', 'HUE', 'SAT', 'VAL', 'ALPHA'], default 'INT'

mask_tex_uv_layer

UV layer name

Type string, default ""

mask_texture

Masking texture

Type Texture

mask_vertex_group

Masking vertex group name

Type string, default ""

mix_mode

How weights from vgroup 2 affect weights of vgroup 1

Type enum in ['SET', 'ADD', 'SUB', 'MUL', 'DIV', 'DIF', 'AVG'], default 'SET'

mix_set

Which vertices should be affected

Type enum in ['ALL', 'A', 'B', 'OR', 'AND'], default 'ALL'

vertex_group_a

First vertex group name

Type string, default ""

vertex_group_b

Second vertex group name

Type string, default ""

Inherited Properties

- bpy_struct.id_data
- Modifier.name
- Modifier.use_apply_on_spline
- Modifier.show_in_editmode
- Modifier.show_expanded
- Modifier.show_on_cage
- Modifier.show_viewport
- Modifier.show_render
- Modifier.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.702 VertexWeightProximityModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.VertexWeightProximityModifier` (*Modifier*)

Set the weights of vertices in a group from a target object's distance

falloff_type

How weights are mapped to there new values

Type enum in ['LINEAR', 'SHARP', 'SMOOTH', 'ROOT', 'ICON_SPHERECURVE', 'RANDOM', 'STEP'], default 'LINEAR'

mask_constant

Global influence of current modifications on vgroup

Type float in [-inf, inf], default 0.0

mask_tex_map_object

Which object to take texture coordinates from

Type `Object`

mask_tex_mapping

Which texture coordinates to use for mapping

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

mask_tex_use_channel

Which texture channel to use for masking

Type enum in ['INT', 'RED', 'GREEN', 'BLUE', 'HUE', 'SAT', 'VAL', 'ALPHA'], default 'INT'

mask_tex_uv_layer

UV layer name

Type string, default ""

mask_texture

Masking texture

Type `Texture`

mask_vertex_group

Masking vertex group name

Type string, default ""

max_dist

Distance mapping to weight 1.0 (or weight 0.0 if below Lowest Dist)

Type float in [0, inf], default 0.0

min_dist

Distance mapping to weight 0.0 (or weight 1.0 if above Highest Dist)

Type float in [0, inf], default 0.0

proximity_geometry

Use the shortest computed distance to target object's geometry as weight

- VERTEX Vertex, Compute distance to nearest vertex.
- EDGE Edge, Compute distance to nearest edge.
- FACE Face, Compute distance to nearest face.

Type enum set in {'VERTEX', 'EDGE', 'FACE'}, default {'VERTEX'}

proximity_mode

Which distances to target object to use

- OBJECT Object Distance, Use distance between affected and target objects.
- GEOMETRY Geometry Distance, Use distance between affected object's vertices and target object, or target object's geometry.

Type enum in ['OBJECT', 'GEOMETRY'], default 'OBJECT'

target

Object to calculate vertices distances from

Type Object

vertex_group

Vertex group name

Type string, default ""

Inherited Properties

- bpy_struct.id_data
- Modifier.name
- Modifier.use_apply_on_spline
- Modifier.show_in_editmode
- Modifier.show_expanded
- Modifier.show_on_cage
- Modifier.show_viewport
- Modifier.show_render
- Modifier.type

Inherited Functions

- bpy_struct.as_pointer
- bpy_struct.callback_add
- bpy_struct.callback_remove
- bpy_struct.driver_add
- bpy_struct.driver_remove
- bpy_struct.get
- bpy_struct.is_property_hidden

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.703 VisibilityActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

class `bpy.types.VisibilityActuator` (*Actuator*)

Actuator to set visibility and occlusion of the object

apply_to_children

Set all the children of this object to the same visibility/occlusion recursively

Type boolean, default False

use_occlusion

Set the object to occlude objects behind it (initialized from the object type in physics button)

Type boolean, default False

use_visible

Set the objects visible (initialized from the object render restriction toggle in physics button)

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`
- `Actuator.name`
- `Actuator.show_expanded`
- `Actuator.pin`
- `Actuator.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`

- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Actuator.link`
- `Actuator.unlink`

2.4.704 VoronoiTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.VoronoiTexture` (*Texture*)

Procedural voronoi texture

color_mode

- **INTENSITY** Intensity, Only calculate intensity.
- **POSITION** Position, Color cells by position.
- **POSITION_OUTLINE** Position and Outline, Use position plus an outline based on F2-F.1.
- **POSITION_OUTLINE_INTENSITY** Position, Outline, and Intensity, Multiply position and outline by intensity.

Type enum in ['INTENSITY', 'POSITION', 'POSITION_OUTLINE', 'POSITION_OUTLINE_INTENSITY'], default 'INTENSITY'

distance_metric

- **DISTANCE** Actual Distance, Algorithm used to calculate distance of sample points to feature points; Actual Distance: $\sqrt{x*x+y*y+z*z}$.
- **DISTANCE_SQUARED** Distance Squared, Algorithm used to calculate distance of sample points to feature points; Distance squared: $(x*x+y*y+z*z)$.
- **MANHATTAN** Manhattan, Algorithm used to calculate distance of sample points to feature points; Manhattan: The length of the distance in axial directions.
- **CHEBYCHEV** Chebychev, Algorithm used to calculate distance of sample points to feature points; Chebychev: The length of the longest Axial journey.
- **MINKOVSKY_HALF** Minkovsky 1/2, Algorithm used to calculate distance of sample points to feature points; Minkovsky 1/2: Sets Minkovsky variable to 0.5.
- **MINKOVSKY_FOUR** Minkovsky 4, Algorithm used to calculate distance of sample points to feature points; Minkovsky 4: Sets Minkovsky variable to 4.
- **MINKOVSKY** Minkovsky, Algorithm used to calculate distance of sample points to feature points; Minkovsky: Uses the Minkovsky function to calculate distance (exponent value determines the shape of the boundaries).

Type enum in ['DISTANCE', 'DISTANCE_SQUARED', 'MANHATTAN', 'CHEBYCHEV', 'MINKOVSKY_HALF', 'MINKOVSKY_FOUR', 'MINKOVSKY'], default 'DISTANCE'

minkovsky_exponent

Minkovsky exponent

Type float in [0.01, 10], default 0.0

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_intensity

Scales the intensity of the noise

Type float in [0.01, 10], default 0.0

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

weight_1

Voronoi feature weight 1

Type float in [-2, 2], default 0.0

weight_2

Voronoi feature weight 2

Type float in [-2, 2], default 0.0

weight_3

Voronoi feature weight 3

Type float in [-2, 2], default 0.0

weight_4

Voronoi feature weight 4

Type float in [-2, 2], default 0.0

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`

- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.705 VoxelData(bpy_struct)

base class — `bpy_struct`

class `bpy.types.VoxelData` (*bpy_struct*)

Voxel data settings

domain_object

Object used as the smoke simulation domain

Type `Object`

extension

Sets how the texture is extrapolated past its original bounds

- **EXTEND** Extend, Extend by repeating edge pixels of the image.
- **CLIP** Clip, Clip to image size and set exterior pixels as transparent.
- **REPEAT** Repeat, Cause the image to repeat horizontally and vertically.

Type enum in ['EXTEND', 'CLIP', 'REPEAT'], default 'EXTEND'

file_format

Format of the source data set to render

- BLENDER_VOXEL** Blender Voxel, Default binary voxel file format.
- RAW_8BIT** 8 bit RAW, 8 bit greyscale binary data.
- IMAGE_SEQUENCE** Image Sequence, Generate voxels from a sequence of image slices.
- SMOKE** Smoke, Render voxels from a Blender smoke simulation.

Type enum in ['BLENDER_VOXEL', 'RAW_8BIT', 'IMAGE_SEQUENCE', 'SMOKE'], default 'BLENDER_VOXEL'

filepath

The external source data file to use

Type string, default ""

intensity

Multiplier for intensity values

Type float in [0.01, inf], default 0.0

interpolation

Method to interpolate/smooth values between voxel cells

- NEREASTNEIGHBOR** Nearest Neighbor, No interpolation, fast but blocky and low quality.
- TRILINEAR** Linear, Good smoothness and speed.
- QUADRATIC** Quadratic, Mid-range quality and speed.
- TRICUBIC_CATROM** Cubic Catmull-Rom, High quality interpolation, but slower.
- TRICUBIC_BSPLINE** Cubic B-Spline, Smoothed high quality interpolation, but slower.

Type enum in ['NEREASTNEIGHBOR', 'TRILINEAR', 'QUADRATIC', 'TRICUBIC_CATROM', 'TRICUBIC_BSPLINE'], default 'NEREASTNEIGHBOR'

resolution

Resolution of the voxel grid

Type int array of 3 items in [1, 100000], default (0, 0, 0)

smoke_data_type

Simulation value to be used as a texture

- SMOKEDENSITY** Density, Use smoke density as texture data.
- SMOKEHEAT** Heat, Use smoke heat as texture data. Values from -2.0 to 2.0 are used.
- SMOKELEVEL** Velocity, Use smoke velocity as texture data.

Type enum in ['SMOKEDENSITY', 'SMOKEHEAT', 'SMOKELEVEL'], default 'SMOKEDENSITY'

still_frame

The frame number to always use

Type int in [-300000, 300000], default 0

use_still_frame

Always render a still frame from the voxel data sequence

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `VoxelDataTexture.voxel_data`

2.4.706 VoxelDataTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.VoxelDataTexture` (*Texture*)

Settings for the Voxel Data texture

image

Type `Image`

image_user

Parameters defining which layer, pass and frame of the image is displayed

Type `ImageUser`, (readonly)

voxel_data

The voxel data associated with this texture

Type `VoxelData`, (readonly)

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Texture.animation_data`
- `Texture.intensity`
- `Texture.color_ramp`
- `Texture.contrast`
- `Texture.factor_blue`
- `Texture.factor_green`
- `Texture.factor_red`
- `Texture.node_tree`
- `Texture.saturation`
- `Texture.use_preview_alpha`
- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.707 WarpModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.WarpModifier` (*Modifier*)

Warp modifier

falloff_curve

Custom Lamp Falloff Curve

Type `CurveMapping`, (readonly)

falloff_radius

Radius to apply

Type float in [-inf, inf], default 0.0

falloff_type

Type enum in ['NONE', 'CURVE', 'SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT'], default 'NONE'

object_from

Object to transform from

Type `Object`

object_to

Object to transform to

Type `Object`

strength

Type float in [-inf, inf], default 0.0

texture

Type `Texture`

texture_coords

- LOCAL Map, Uses the local coordinate system for the texture coordinates.
- GLOBAL Global, Uses the global coordinate system for the texture coordinates.
- OBJECT Object, Uses the linked object's local coordinate system for the texture coordinates.
- UV UV, Uses UV coordinates for the texture coordinates.

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

texture_coords_object

Object to set the texture coordinates

Type `Object`

use_volume_preserve

Preserve volume when rotations are used

Type boolean, default False

uv_layer

UV layer name

Type string, default ""

vertex_group

Vertex group name for modulating the deform

Type string, default ""

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.708 WaveModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

class `bpy.types.WaveModifier` (*Modifier*)

Wave effect modifier

damping_time

Number of frames in which the waves damps out after it dies

Type float in [-300000, 300000], default 0.0

falloff_radius

Distance after which it fades out

Type float in [0, inf], default 0.0

height

Height of the wave

Type float in [-inf, inf], default 0.0

lifetime

Lifetime of the wave in frames, zero means infinite

Type float in [-300000, 300000], default 0.0

narrowness

Distance between the top and the base of a wave, the higher the value, the more narrow the wave

Type float in [0, inf], default 0.0

speed

Speed of the wave, towards the starting point when negative

Type float in [-inf, inf], default 0.0

start_position_object

Object which defines the wave center

Type *Object*

start_position_x

X coordinate of the start position

Type float in [-inf, inf], default 0.0

start_position_y

Z coordinate of the start position

Type float in [-inf, inf], default 0.0

texture

Texture for modulating the wave

Type *Texture*

texture_coords

Texture coordinates used for modulating input

Type enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'MAP_UV'], default 'LOCAL'

texture_coords_object

Type *Object*

time_offset

Either the starting frame (for positive speed) or ending frame (for negative speed.)

Type float in [-300000, 300000], default 0.0

use_cyclic

Cyclic wave effect

Type boolean, default False

use_normal

Displace along normals

Type boolean, default False

use_normal_x

Enable displacement along the X normal

Type boolean, default False

use_normal_y

Enable displacement along the Y normal

Type boolean, default False

use_normal_z

Enable displacement along the Z normal

Type boolean, default False

use_x

X axis motion

Type boolean, default False

use_y

Y axis motion

Type boolean, default False

uv_layer

UV layer name

Type string, default ""

vertex_group

Vertex group name for modulating the wave

Type string, default ""

width

Distance between the waves

Type float in [0, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `Modifier.use_apply_on_spline`
- `Modifier.show_in_editmode`
- `Modifier.show_expanded`
- `Modifier.show_on_cage`
- `Modifier.show_viewport`
- `Modifier.show_render`
- `Modifier.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

2.4.709 Window(`bpy_struct`)

base class — `bpy_struct`

class `bpy.types.Window` (*bpy_struct*)
Open window

screen

Active screen showing in the window

Type `Screen`, (never `None`)

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `Context.window`
- `WindowManager.event_timer_add`
- `WindowManager.windows`

2.4.710 WindowManager(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.WindowManager` (*ID*)
Window manager datablock defining open windows and other user interface data

addon_filter
Filter addons by category
Type enum in [], default “

addon_search
Search within the selected filter
Type string, default “”

addon_support
Display support level

- OFFICIAL Official, Officially supported.
- COMMUNITY Community, Maintained by community developers.
- TESTING Testing, Newly contributed scripts (excluded from release builds).

Type enum set in {‘OFFICIAL’, ‘COMMUNITY’, ‘TESTING’}, default {‘OFFICIAL’, ‘COMMUNITY’}

clipboard
Type string, default “”

keyconfigs
Registered key configurations
Type `KeyConfigurations` `bpy_prop_collection` of `KeyConfig`, (readonly)

operators
Operator registry
Type `bpy_prop_collection` of `Operator`, (readonly)

windows
Open windows
Type `bpy_prop_collection` of `Window`, (readonly)

classmethod `fileselect_add` (*operator*)
Show up the file selector
Parameters `operator` (`Operator`) – Operator to call

classmethod `modal_handler_add` (*operator*)
`modal_handler_add`
Parameters `operator` (`Operator`) – Operator to call
Return type boolean

event_timer_add (*time_step*, *window=None*)
`event_timer_add`
Parameters

- **time_step** (*float in [0, inf]*) – Time Step, Interval in seconds between timer events
- **window** (`Window`, (optional)) – Window to attach the timer to or None

Return type `Timer`

event_timer_remove (*timer*)
 event_timer_remove

classmethod invoke_props_popup (*operator, event*)
 Operator popup invoke

Parameters

- **operator** (*Operator*) – Operator to call
- **event** (*Event*) – Event

Returns

result

- **RUNNING_MODAL** Running Modal, Keep the operator running with blender.
- **CANCELLED** Cancelled, When no action has been taken, operator exits.
- **FINISHED** Finished, When the operator is complete, operator exits.
- **PASS_THROUGH** Pass Through, Do nothing and pass the event on.

Return type enum set in {'RUNNING_MODAL', 'CANCELLED', 'FINISHED', 'PASS_THROUGH'}

classmethod invoke_props_dialog (*operator, width=300, height=20*)
 Operator dialog (non-autoexec popup) invoke

Parameters

- **operator** (*Operator*) – Operator to call
- **width** (*int in [0, inf], (optional)*) – Width of the popup
- **height** (*int in [0, inf], (optional)*) – Height of the popup

Returns

result

- **RUNNING_MODAL** Running Modal, Keep the operator running with blender.
- **CANCELLED** Cancelled, When no action has been taken, operator exits.
- **FINISHED** Finished, When the operator is complete, operator exits.
- **PASS_THROUGH** Pass Through, Do nothing and pass the event on.

Return type enum set in {'RUNNING_MODAL', 'CANCELLED', 'FINISHED', 'PASS_THROUGH'}

classmethod invoke_search_popup (*operator*)
 invoke_search_popup

Parameters **operator** (*Operator*) – Operator to call

classmethod invoke_popup (*operator, width=300, height=20*)
 Operator popup invoke

Parameters

- **operator** (*Operator*) – Operator to call
- **width** (*int in [0, inf], (optional)*) – Width of the popup

- **height** (*int in [0, inf], (optional)*) – Height of the popup

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

classmethod `invoke_confirm` (*operator, event*)

Operator confirmation

Parameters

- **operator** (`Operator`) – Operator to call
- **event** (`Event`) – Event

Returns

result

- `RUNNING_MODAL` Running Modal, Keep the operator running with blender.
- `CANCELLED` Cancelled, When no action has been taken, operator exits.
- `FINISHED` Finished, When the operator is complete, operator exits.
- `PASS_THROUGH` Pass Through, Do nothing and pass the event on.

Return type enum set in {`'RUNNING_MODAL'`, `'CANCELLED'`, `'FINISHED'`, `'PASS_THROUGH'`}

Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.window_managers`
- `Context.window_manager`

2.4.711 WipeSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

class `bpy.types.WipeSequence` (*EffectSequence*)

Sequence strip creating a wipe transition

angle

Edge angle

Type float in [-1.5708, 1.5708], default 0.0

blur_width

Width of the blur edge, in percentage relative to the image size

Type float in [0, 1], default 0.0

direction

Wipe direction

Type enum in ['OUT', 'IN'], default 'OUT'

transition_type

Type enum in ['SINGLE', 'DOUBLE', 'IRIS', 'CLOCK'], default 'SINGLE'

Inherited Properties

- `bpy_struct.id_data`
- `Sequence.name`
- `Sequence.blend_type`
- `Sequence.blend_alpha`
- `Sequence.channel`
- `Sequence.waveform`
- `Sequence.effect_fader`
- `Sequence.frame_final_end`

- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `Sequence.input_1`
- `Sequence.input_2`
- `Sequence.input_3`
- `Sequence.select_left_handle`
- `Sequence.frame_final_duration`
- `Sequence.frame_duration`
- `Sequence.lock`
- `Sequence.mute`
- `Sequence.select_right_handle`
- `Sequence.select`
- `Sequence.speed_factor`
- `Sequence.frame_start`
- `Sequence.frame_final_start`
- `Sequence.frame_offset_start`
- `Sequence.frame_still_start`
- `Sequence.type`
- `Sequence.use_default_fade`
- `Sequence.input_count`
- `EffectSequence.color_balance`
- `EffectSequence.use_float`
- `EffectSequence.crop`
- `EffectSequence.use_deinterlace`
- `EffectSequence.use_reverse_frames`
- `EffectSequence.use_flip_x`
- `EffectSequence.use_flip_y`
- `EffectSequence.color_multiply`
- `EffectSequence.use_premultiply`
- `EffectSequence.proxy`
- `EffectSequence.use_proxy_custom_directory`
- `EffectSequence.use_proxy_custom_file`
- `EffectSequence.color_saturation`
- `EffectSequence.strobe`
- `EffectSequence.ttransform`
- `EffectSequence.use_color_balance`
- `EffectSequence.use_crop`
- `EffectSequence.use_proxy`
- `EffectSequence.use_translation`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`

- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Sequence.getStripElem`
- `Sequence.swap`

2.4.712 WoodTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

class `bpy.types.WoodTexture` (*Texture*)

Procedural noise texture

nabla

Size of derivative offset used for calculating normal

Type float in [0.001, 0.1], default 0.0

noise_basis

Sets the noise basis used for turbulence

- `BLENDER_ORIGINAL` Blender Original, Noise algorithm - Blender original: Smooth interpolated noise.
- `ORIGINAL_PERLIN` Original Perlin, Noise algorithm - Original Perlin: Smooth interpolated noise.
- `IMPROVED_PERLIN` Improved Perlin, Noise algorithm - Improved Perlin: Smooth interpolated noise.
- `VORONOI_F1` Voronoi F1, Noise algorithm - Voronoi F1: Returns distance to the closest feature point.
- `VORONOI_F2` Voronoi F2, Noise algorithm - Voronoi F2: Returns distance to the 2nd closest feature point.
- `VORONOI_F3` Voronoi F3, Noise algorithm - Voronoi F3: Returns distance to the 3rd closest feature point.
- `VORONOI_F4` Voronoi F4, Noise algorithm - Voronoi F4: Returns distance to the 4th closest feature point.
- `VORONOI_F2_F1` Voronoi F2-F1, Noise algorithm - Voronoi F1-F2.
- `VORONOI_CRACKLE` Voronoi Crackle, Noise algorithm - Voronoi Crackle: Voronoi tessellation with sharp edges.
- `CELL_NOISE` Cell Noise, Noise algorithm - Cell Noise: Square cell tessellation.

Type enum in ['BLENDER_ORIGINAL', 'ORIGINAL_PERLIN', 'IMPROVED_PERLIN', 'VORONOI_F1', 'VORONOI_F2', 'VORONOI_F3', 'VORONOI_F4', 'VORONOI_F2_F1', 'VORONOI_CRACKLE', 'CELL_NOISE'], default 'BLENDER_ORIGINAL'

noise_basis_2

- `SIN` Sine, Uses a sine wave to produce bands.
- `SAW` Saw, Uses a saw wave to produce bands.
- `TRI` Tri, Uses a triangle wave to produce bands.

Type enum in ['SIN', 'SAW', 'TRI'], default 'SIN'

noise_scale

Sets scaling for noise input

Type float in [0.0001, inf], default 0.0

noise_type

- SOFT_NOISE Soft, Generate soft noise (smooth transitions).
- HARD_NOISE Hard, Generate hard noise (sharp transitions).

Type enum in ['SOFT_NOISE', 'HARD_NOISE'], default 'SOFT_NOISE'

turbulence

Sets the turbulence of the bandnoise and ringnoise types

Type float in [0.0001, inf], default 0.0

wood_type

- BANDS Bands, Uses standard wood texture in bands.
- RINGS Rings, Uses wood texture in rings.
- BANDNOISE Band Noise, Adds noise to standard wood.
- RINGNOISE Ring Noise, Adds noise to rings.

Type enum in ['BANDS', 'RINGS', 'BANDNOISE', 'RINGNOISE'], default 'BANDS'

users_material

Materials that use this texture (readonly)

users_object_modifier

Object modifiers that use this texture (readonly)

Inherited Properties

- bpy_struct.id_data
- ID.name
- ID.use_fake_user
- ID.is_updated
- ID.is_updated_data
- ID.library
- ID.tag
- ID.users
- Texture.animation_data
- Texture.intensity
- Texture.color_ramp
- Texture.contrast
- Texture.factor_blue
- Texture.factor_green
- Texture.factor_red
- Texture.node_tree
- Texture.saturation
- Texture.use_preview_alpha

- `Texture.type`
- `Texture.use_color_ramp`
- `Texture.use_nodes`
- `Texture.users_material`
- `Texture.users_object_modifier`
- `Texture.users_material`
- `Texture.users_object_modifier`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`
- `Texture.evaluate`

2.4.713 World(ID)

base classes — `bpy_struct`, `ID`

class `bpy.types.World` (*ID*)

World datablock describing the environment and ambient lighting of a scene

active_texture

Active texture slot being displayed

Type `Texture`

active_texture_index

Index of active texture slot

Type `int` in `[0, 17]`, default `0`

ambient_color

Ambient color of the world

Type `float` array of 3 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0)`

animation_data

Animation data for this datablock

Type `AnimData`, (readonly)

color_range

The color range that will be mapped to 0-1

Type float in [0.2, 5], default 0.0

exposure

Amount of exponential color correction for light

Type float in [0, 1], default 0.0

horizon_color

Color at the horizon

Type float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

light_settings

World lighting settings

Type `WorldLighting`, (readonly, never None)

mist_settings

World mist settings

Type `WorldMistSettings`, (readonly, never None)

node_tree

Node tree for node based worlds

Type `NodeTree`, (readonly)

star_settings

World stars settings

Type `WorldStarsSettings`, (readonly, never None)

texture_slots

Texture slots defining the mapping and influence of textures

Type `WorldTextureSlots` `bpy_prop_collection` of `WorldTextureSlot`, (readonly)

use_nodes

Use shader nodes to render the world

Type boolean, default False

use_sky_blend

Render background with natural progression from horizon to zenith

Type boolean, default False

use_sky_paper

Flatten blend or texture coordinates

Type boolean, default False

use_sky_real

Render background with a real horizon, relative to the camera angle

Type boolean, default False

zenith_color

Color at the zenith

Type float array of 3 items in $[-\text{inf}, \text{inf}]$, default (0.0, 0.0, 0.0)**Inherited Properties**

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.is_updated`
- `ID.is_updated_data`
- `ID.library`
- `ID.tag`
- `ID.users`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `ID.copy`
- `ID.user_clear`
- `ID.animation_data_create`
- `ID.animation_data_clear`
- `ID.update_tag`

References

- `BlendData.worlds`
- `BlendDataWorlds.new`
- `BlendDataWorlds.remove`
- `Scene.world`

2.4.714 WorldLighting(`bpy_struct`)base class — `bpy_struct`

class `bpy.types.WorldLighting` (*bpy_struct*)

Lighting for a World datablock

adapt_to_speed

Use the speed vector pass to reduce AO samples in fast moving pixels. Higher values result in more aggressive sample reduction. Requires Vec pass enabled (for Raytrace Adaptive QMC)

Type float in [0, 1], default 0.0

ao_blend_type

Defines how AO mixes with material shading

- MULTIPLY Multiply, Multiply direct lighting with ambient occlusion, darkening the result.
- ADD Add, Add light and shadow.

Type enum in ['MULTIPLY', 'ADD'], default 'ADD'

ao_factor

Factor for ambient occlusion blending

Type float in [0, inf], default 0.0

bias

Bias (in radians) to prevent smoothed faces from showing banding (for Raytrace Constant Jittered)

Type float in [0, 0.5], default 0.0

correction

Ad-hoc correction for over-occlusion due to the approximation

Type float in [0, 1], default 0.0

distance

Length of rays, defines how far away other faces give occlusion effect

Type float in [-inf, inf], default 0.0

environment_color

Defines where the color of the environment light comes from

- PLAIN White, Plain diffuse energy (white.).
- SKY_COLOR Sky Color, Use horizon and zenith color for diffuse energy.
- SKY_TEXTURE Sky Texture, Does full Sky texture render for diffuse energy.

Type enum in ['PLAIN', 'SKY_COLOR', 'SKY_TEXTURE'], default 'PLAIN'

environment_energy

Defines the strength of environment light

Type float in [-inf, inf], default 0.0

error_threshold

Low values are slower and higher quality

Type float in [0.0001, 10], default 0.0

falloff_strength

Attenuation falloff strength, the higher, the less influence distant objects have

Type float in [-inf, inf], default 0.0

gather_method

- RAYTRACE Raytrace, Accurate, but slow when noise-free results are required.
- APPROXIMATE Approximate, Inaccurate, but faster and without noise.

Type enum in ['RAYTRACE', 'APPROXIMATE'], default 'RAYTRACE'

indirect_bounces

Number of indirect diffuse light bounces

Type int in [1, 32767], default 0

indirect_factor

Factor for how much surrounding objects contribute to light

Type float in [0, inf], default 0.0

passes

Number of preprocessing passes to reduce overocclusion

Type int in [0, 10], default 0

sample_method

Method for generating shadow samples (for Raytrace)

- CONSTANT_JITTERED Constant Jittered, Fastest and gives the most noise.
- ADAPTIVE_QMC Adaptive QMC, Fast in high-contrast areas.
- CONSTANT_QMC Constant QMC, Best quality.

Type enum in ['CONSTANT_JITTERED', 'ADAPTIVE_QMC', 'CONSTANT_QMC'], default 'CONSTANT_JITTERED'

samples

Amount of ray samples. Higher values give smoother results and longer rendering times

Type int in [1, 128], default 0

threshold

Samples below this threshold will be considered fully shadowed/unshadowed and skipped (for Raytrace Adaptive QMC)

Type float in [0, 1], default 0.0

use_ambient_occlusion

Use Ambient Occlusion to add shadowing based on distance between objects

Type boolean, default False

use_cache

Cache AO results in pixels and interpolate over neighbouring pixels for speedup

Type boolean, default False

use_environment_light

Add light coming from the environment

Type boolean, default False

use_falloff

Distance will be used to attenuate shadows

Type boolean, default False

use_indirect_light

Add indirect light bouncing of surrounding objects

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `World.light_settings`

2.4.715 WorldMistSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.WorldMistSettings` (*bpy_struct*)

Mist settings for a World data-block

depth

Distance over which the mist effect fades in

Type float in [0, inf], default 0.0

falloff

Type of transition used to fade mist

- `QUADRATIC` Quadratic, Mist uses quadratic progression.
- `LINEAR` Linear, Mist uses linear progression.
- `INVERSE_QUADRATIC` Inverse Quadratic, Mist uses inverse quadratic progression.

Type enum in ['QUADRATIC', 'LINEAR', 'INVERSE_QUADRATIC'], default 'QUADRATIC'

height

Control how much mist density decreases with height

Type float in [0, 100], default 0.0

intensity

Overall minimum intensity of the mist effect

Type float in [0, 1], default 0.0

start

Starting distance of the mist, measured from the camera

Type float in [0, inf], default 0.0

use_mist

Occlude objects with the environment color as they are further away

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `World.mist_settings`

2.4.716 WorldStarsSettings(bpy_struct)

base class — `bpy_struct`

class `bpy.types.WorldStarsSettings` (*bpy_struct*)
Stars settings for a World data-block

average_separation

Average distance between any two stars

Type float in [2, 1000], default 0.0

color_random

Randomize star colors

Type float in [0, 1], default 0.0

distance_min

Minimum distance to the camera for stars

Type float in [0, 1000], default 0.0

size

Average screen dimension of stars

Type float in [0, 10], default 0.0

use_stars

Enable starfield generation

Type boolean, default False

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `World.star_settings`

2.4.717 WorldTextureSlot(TextureSlot)

base classes — `bpy_struct`, `TextureSlot`

class `bpy.types.WorldTextureSlot` (*TextureSlot*)

Texture slot for textures in a World datablock

blend_factor

Amount texture affects color progression of the background

Type float in [-inf, inf], default 0.0

horizon_factor

Amount texture affects color of the horizon

Type float in [-inf, inf], default 0.0

object

Object to use for mapping with Object texture coordinates

Type `Object`

texture_coords

Texture coordinates used to map the texture onto the background

- VIEW View, Uses view vector for the texture coordinates.
- GLOBAL Global, Uses global coordinates for the texture coordinates (interior mist).
- ANGMAP AngMap, Uses 360 degree angular coordinates, e.g. for spherical light probes.
- SPHERE Sphere, For 360 degree panorama sky, spherical mapped, only top half.
- TUBE Tube, For 360 degree panorama sky, cylindrical mapped, only top half.
- OBJECT Object, Uses linked object's coordinates for texture coordinates.

Type enum in ['VIEW', 'GLOBAL', 'ANGMAP', 'SPHERE', 'TUBE', 'OBJECT'], default 'VIEW'

use_map_blend

Affect the color progression of the background

Type boolean, default False

use_map_horizon

Affect the color of the horizon

Type boolean, default False

use_map_zenith_down

Affect the color of the zenith below

Type boolean, default False

use_map_zenith_up

Affect the color of the zenith above

Type boolean, default False

zenith_down_factor

Amount texture affects color of the zenith below

Type float in [-inf, inf], default 0.0

zenith_up_factor

Amount texture affects color of the zenith above

Type float in [-inf, inf], default 0.0

Inherited Properties

- `bpy_struct.id_data`
- `TextureSlot.name`
- `TextureSlot.blend_type`
- `TextureSlot.color`
- `TextureSlot.default_value`
- `TextureSlot.invert`
- `TextureSlot.offset`
- `TextureSlot.output_node`
- `TextureSlot.use_rgb_to_intensity`
- `TextureSlot.scale`
- `TextureSlot.use_stencil`
- `TextureSlot.texture`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `World.texture_slots`
- `WorldTextureSlots.add`
- `WorldTextureSlots.create`

2.4.718 WorldTextureSlots(*bpy_struct*)

base class — `bpy_struct`

class `bpy.types.WorldTextureSlots` (*bpy_struct*)

Collection of texture slots

classmethod `add()`

`add`

Returns The newly initialized mtex

Return type `WorldTextureSlot`

classmethod `create(index)`

`create`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to initialize

Returns The newly initialized mtex

Return type `WorldTextureSlot`

classmethod `clear(index)`

`clear`

Parameters `index` (*int in [0, inf]*) – Index, Slot index to clear

Inherited Properties

- `bpy_struct.id_data`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

References

- `World.texture_slots`

2.4.719 XnorController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.XnorController` (*Controller*)

Controller passing on events based on a logical XNOR operation

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.720 XorController(Controller)

base classes — `bpy_struct`, `Controller`

class `bpy.types.XorController` (*Controller*)
Controller passing on events based on a logical XOR operation

Inherited Properties

- `bpy_struct.id_data`
- `Controller.name`
- `Controller.states`
- `Controller.show_expanded`
- `Controller.use_priority`
- `Controller.type`

Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Controller.link`
- `Controller.unlink`

2.4.721 bpy_prop_collection

class `bpy.types.bpy_prop_collection`

built-in class used for all collections.

Note: Note that `bpy.types.bpy_prop_collection` is not actually available from within blender, it only exists for the purpose of documentation.

foreach_get (*attr, seq*)

This is a function to give fast access to attributes within a collection.

```
collection.foreach_get(someseq, attr)
```

```
# Python equivalent
```

```
for i in range(len(seq)): someseq[i]= getattr(collection, attr)
```

foreach_set (*attr, seq*)

This is a function to give fast access to attributes within a collection.

```
collection.foreach_set(seq, attr)
```

```
# Python equivalent
```

```
for i in range(len(seq)): setattr(collection[i], attr, seq[i])
```

get (*key, default=None*)

Returns the value of the item assigned to key or default when not found (matches python's dictionary function of the same name).

Parameters

- **key** (*string*) – The identifier for the collection member.
- **default** (*Undefined*) – Optional argument for the value to return if *key* is not found.

items ()

Return the identifiers of collection members (matching python's `dict.items()` functionality).

Returns (key, value) pairs for each member of this collection.

Return type list of tuples

keys ()

Return the identifiers of collection members (matching python's dict.keys() functionality).

Returns the identifiers for each member of this collection.

Return type list of strings

values ()

Return the values of collection (matching python's dict.values() functionality).

Returns the members of this collection.

Return type list

2.4.722 bpy_struct

subclasses — ActionFCurves, ActionGroup, ActionGroups, ActionPoseMarkers, Actuator, Addon, Addons, AnimData, AnimDataDrivers, AnimViz, AnimVizMotionPaths, AnimVizOnionSkinning, AnyType, Area, AreaSpaces, ArmatureBones, ArmatureEditBones, BackgroundImage, BackgroundImages, BezierSplinePoint, BlendData, BlendDataActions, BlendDataArmatures, BlendDataBrushes, BlendDataCameras, BlendDataCurves, BlendDataFonts, BlendDataGreasePencils, BlendDataGroups, BlendDataImages, BlendDataLamps, BlendDataLattices, BlendDataLibraries, BlendDataMaterials, BlendDataMeshes, BlendDataMetaBalls, BlendDataMovieClips, BlendDataNodeTrees, BlendDataObjects, BlendDataParticles, BlendDataScenes, BlendDataScreens, BlendDataSounds, BlendDataSpeakers, BlendDataTexts, BlendDataTextures, BlendDataWindowManagers, BlendDataWorlds, BlenderRNA, BoidRule, BoidSettings, BoidState, Bone, BoneGroup, BoneGroups, ChannelDriverVariables, ChildParticle, ClothCollisionSettings, ClothSettings, CollisionSettings, ColorMapping, ColorRamp, ColorRampElement, ColorRampElements, CompositorNodes, ConsoleLine, Constraint, ConstraintTarget, Context, Controller, CurveMap, CurveMapPoint, CurveMapping, CurveSplines, DopeSheet, Driver, DriverTarget, DriverVariable, DupliObject, DynamicPaintBrushSettings, DynamicPaintCanvasSettings, DynamicPaintSurface, DynamicPaintSurfaces, EditBone, EffectorWeights, EnumPropertyItem, EnvironmentMap, Event, FCurve, FCurveKeyframePoints, FCurveModifiers, FCurveSample, FModifier, FModifierEnvelopeControlPoint, FieldSettings, FileSelectParams, FloatProperties, FluidMeshVertex, FluidSettings, Function, GPencilFrame, GPencilLayer, GPencilStroke, GPencilStrokePoint, GameObjectSettings, GameProperty, GameSoftBodySettings, GreasePencilLayers, GroupInputs, GroupObjects, GroupOutputs, Header, Histogram, ID, IDMaterials, IKParam, ImageUser, IntProperties, KeyConfig, KeyConfigurations, KeyMap, KeyMapItem, KeyMapItems, KeyMaps, Keyframe, KeyingSet, KeyingSetInfo, KeyingSetPath, KeyingSetPaths, KeyingSets, KeyingSetsAll, LampSkySettings, LampTextureSlots, LatticePoint, Macro, MaterialGameSettings, MaterialHalo, MaterialPhysics, MaterialRaytraceMirror, MaterialRaytraceTransparency, MaterialSlot, MaterialStrand, MaterialSubsurfaceScattering, MaterialTextureSlots, MaterialVolume, Menu, MeshColor, MeshColorLayer, MeshEdge, MeshEdges, MeshFace, MeshFaces, MeshFloatProperty, MeshFloatPropertyLayer, MeshIntProperty, MeshIntPropertyLayer, MeshSticky, MeshStringProperty, MeshStringPropertyLayer, MeshTextureFace, MeshTextureFaceLayer, MeshVertex, MeshVertices, MetaBallElements, MetaElement, Modifier, MotionPath, MotionPathVert, MovieClipProxy, MovieClipScopes, MovieClipUser, MovieReconstructedCamera, MovieTracking, MovieTrackingCamera, MovieTrackingMarker, MovieTrackingReconstruction, MovieTrackingSettings, MovieTrackingStabilization, MovieTrackingTrack, MovieTrackingTracks, NlaStrip, NlaStrips, NlaTrack, NlaTracks, Node, NodeLink, NodeLinks, NodeSocket, ObjectBase, ObjectConstraints, ObjectModifiers, OceanTexData, Operator, OperatorMacro, OperatorProperties, PackedFile, Paint, Panel, Particle,

ParticleBrush, ParticleDupliWeight, ParticleEdit, ParticleHairKey, ParticleKey, ParticleSettingsTextureSlots, ParticleSystem, ParticleSystems, ParticleTarget, PointCache, PointCaches, PointDensity, Pose, PoseBone, PoseBoneConstraints, Property, PropertyGroup, PropertyGroupItem, Region, RegionView3D, RenderEngine, RenderLayer, RenderLayers, RenderPass, RenderResult, RenderSettings, SPHFluidSettings, SceneBases, SceneGameData, SceneGameRecastData, SceneObjects, SceneRenderLayer, Scopes, Sensor, Sequence, SequenceColorBalance, SequenceCrop, SequenceEditor, SequenceElement, SequenceProxy, SequenceTransform, ShaderNodes, ShapeKey, ShapeKeyBezierPoint, ShapeKeyCurvePoint, ShapeKeyPoint, SmokeCollSettings, SmokeDomainSettings, SmokeFlowSettings, SoftBodySettings, Space, SpaceUVEditor, Spline, SplineBezierPoints, SplinePoint, SplinePoints, StringProperties, Struct, TexMapping, TextBox, TextCharacterFormat, TextLine, TextMarker, TextureNodes, TextureSlot, Theme, ThemeBoneColorSet, ThemeClipEditor, ThemeConsole, ThemeDopeSheet, ThemeFileBrowser, ThemeFontStyle, ThemeGraphEditor, ThemeImageEditor, ThemeInfo, ThemeLogicEditor, ThemeNLAEditor, ThemeNodeEditor, ThemeOutliner, ThemeProperties, ThemeSequenceEditor, ThemeStyle, ThemeTextEditor, ThemeTimeline, ThemeUserInterface, ThemeUserPreferences, ThemeView3D, ThemeWidgetColors, ThemeWidgetStateColors, TimelineMarker, TimelineMarkers, Timer, ToolSettings, TransformOrientation, UILayout, UVProjector, UVTextures, UnitSettings, UnknownType, UserPreferences, UserPreferencesEdit, UserPreferencesFilePaths, UserPreferencesInput, UserPreferencesSystem, UserPreferencesView, UserSolidLight, VertexColors, VertexGroup, VertexGroupElement, VertexGroups, VoxelData, Window, WorldLighting, WorldMistSettings, WorldStarsSettings, WorldTextureSlots

class `bpy.types.bpy_struct`

built-in base class for all classes in `bpy.types`.

Note: Note that `bpy.types.bpy_struct` is not actually available from within blender, it only exists for the purpose of documentation.

as_pointer ()

Returns the memory address which holds a pointer to blenders internal data

Returns `int` (memory address).

Return type `int`

Note: This is intended only for advanced script writers who need to pass blender data to their own C/Python modules.

Undocumented ([contribute](#))

Undocumented ([contribute](#))

driver_add (*path*, *index=-1*)

Adds driver(s) to the given property

Parameters

- **path** (*string*) – path to the property to drive, analogous to the fcurve’s data path.
- **index** (*int*) – array index of the property drive. Defaults to -1 for all indices or a single channel if the property is not an array.

Returns The driver(s) added.

Return type `bpy.types.FCurve` or list if index is -1 with an array property.

driver_remove (*path*, *index=-1*)
Remove driver(s) from the given property

Parameters

- **path** (*string*) – path to the property to drive, analogous to the fcurve’s data path.
- **index** (*int*) – array index of the property drive. Defaults to -1 for all indices or a single channel if the property is not an array.

Returns Success of driver removal.

Return type boolean

get (*key*, *default=None*)
Returns the value of the custom property assigned to key or default when not found (matches python’s dictionary function of the same name).

Parameters

- **key** (*string*) – The key associated with the custom property.
- **default** (*Undefined*) – Optional argument for the value to return if *key* is not found.

Note: Only `bpy.types.ID`, `bpy.types.Bone` and `bpy.types.PoseBone` classes support custom properties.

is_property_hidden (*property*)
Check if a property is hidden.

Returns True when the property is hidden.

Return type boolean

is_property_set (*property*)
Check if a property is set, use for testing operator properties.

Returns True when the property has been set.

Return type boolean

items ()
Returns the items of this objects custom properties (matches python’s dictionary function of the same name).

Returns custom property key, value pairs.

Return type list of key, value tuples

Note: Only `bpy.types.ID`, `bpy.types.Bone` and `bpy.types.PoseBone` classes support custom properties.

keyframe_delete (*data_path*, *index=-1*, *frame=bpy.context.scene.frame_current*, *group=""*)
Remove a keyframe from this properties fcurve.

Parameters

- **data_path** (*string*) – path to the property to remove a key, analogous to the fcurve’s data path.
- **index** (*int*) – array index of the property to remove a key. Defaults to -1 removing all indices or a single channel if the property is not an array.

- **frame** (*float*) – The frame on which the keyframe is deleted, defaulting to the current frame.
- **group** (*str*) – The name of the group the F-Curve should be added to if it doesn't exist yet.

Returns Success of keyframe deletion.

Return type boolean

keyframe_insert (*data_path, index=-1, frame=bpy.context.scene.frame_current, group=""*)
Insert a keyframe on the property given, adding fcurves and animation data when necessary.

Parameters

- **data_path** (*string*) – path to the property to key, analogous to the fcurve's data path.
- **index** (*int*) – array index of the property to key. Defaults to -1 which will key all indices or a single channel if the property is not an array.
- **frame** (*float*) – The frame on which the keyframe is inserted, defaulting to the current frame.
- **group** (*str*) – The name of the group the F-Curve should be added to if it doesn't exist yet.

Returns Success of keyframe insertion.

Return type boolean

This is the most simple example of inserting a keyframe from python.

```
import bpy

obj = bpy.context.object

# set the keyframe at frame 1
obj.location = 3.0, 4.0, 10.0
obj.keyframe_insert(data_path="location", frame=1)
```

Note that when keying data paths which contain nested properties this must be done from the `ID` subclass, in this case the `Armature` rather than the bone.

```
import bpy
from bpy.props import PointerProperty

# define a nested property
class MyPropGroup(bpy.types.PropertyGroup):
    nested = bpy.props.FloatProperty(name="Nested", default=0.0)

# register it so its available for all bones
bpy.utils.register_class(MyPropGroup)
bpy.types.Bone.my_prop = PointerProperty(type=MyPropGroup,
                                         name="MyProp")

# get a bone
obj = bpy.data.objects["Armature"]
arm = obj.data

# set the keyframe at frame 1
arm.bones["Bone"].my_prop_group.nested = 10
arm.keyframe_insert(data_path='bones["Bone"].my_prop.nested',
                    frame=1,
                    group="Nested Group")
```

keys ()

Returns the keys of this objects custom properties (matches pythons dictionary function of the same name).

Returns custom property keys.

Return type list of strings

Note: Only `bpy.types.ID`, `bpy.types.Bone` and `bpy.types.PoseBone` classes support custom properties.

path_from_id (*property=""*)

Returns the data path from the ID to this object (string).

Parameters *property* (*string*) – Optional property name which can be used if the path is to a property of this object.

Returns The path from `bpy.types.bpy_struct.id_data` to this struct and property (when given).

Return type str

path_resolve (*path, coerce=True*)

Returns the property from the path, raise an exception when not found.

Parameters

- **path** (*string*) – path which this property resolves.
- **coerce** (*boolean*) – optional argument, when True, the property will be converted into its python representation.

type_recast ()

Return a new instance, this is needed because types such as textures can be changed at runtime.

Returns a new instance of this object with the type initialized again.

Return type subclass of `bpy.types.bpy_struct`

values ()

Returns the values of this objects custom properties (matches pythons dictionary function of the same name).

Returns custom property values.

Return type list

Note: Only `bpy.types.ID`, `bpy.types.Bone` and `bpy.types.PoseBone` classes support custom properties.

id_data

The `bpy.types.ID` object this datablock is from or None, (not available for all data types)

2.5 Utilities (bpy.utils)

This module contains utility functions specific to blender but not associated with blenders internal data.

`bpy.utils.blend_paths` (*absolute=False, packed=False, local=False*)

Returns a list of paths to external files referenced by the loaded .blend file.

Parameters

- **absolute** (*boolean*) – When true the paths returned are made absolute.
- **packed** (*boolean*) – When true skip file paths for packed data.
- **local** (*boolean*) – When true skip linked library paths.

Returns path list.

Return type list of strings

`bpy.utils.register_class` (*cls*)

Register a subclass of a blender type in (`bpy.types.Panel`, `bpy.types.Menu`, `bpy.types.Header`, `bpy.types.Operator`, `bpy.types.KeyingSetInfo`, `bpy.types.RenderEngine`).

If the class has a `register` class method it will be called before registration.

Note: `ValueError` exception is raised if the class is not a subclass of a registerable blender class.

`bpy.utils.resource_path` (*type*, *major=2*, *minor=57*)

Return the base path for storing system files.

Parameters

- **type** (*string*) – string in ['USER', 'LOCAL', 'SYSTEM'].
- **major** (*int*) – major version, defaults to current.
- **minor** (*string*) – minor version, defaults to current.

Returns the resource path (not necessarily existing).

Return type string

`bpy.utils.unregister_class` (*cls*)

Unload the python class from blender.

If the class has an `unregister` class method it will be called before unregistering.

`bpy.utils.keyconfig_set` (*filepath*)

`bpy.utils.load_scripts` (*reload_scripts=False*, *refresh_scripts=False*)

Load scripts and run each modules register function.

Parameters

- **reload_scripts** (*bool*) – Causes all scripts to have their unregister method called before loading.
- **refresh_scripts** (*bool*) – only load scripts which are not already loaded as modules.

`bpy.utils.modules_from_path` (*path*, *loaded_modules*)

Load all modules in a path and return them as a list.

Parameters

- **path** (*string*) – this path is scanned for scripts and packages.
- **loaded_modules** (*set*) – already loaded module names, files matching these names will be ignored.

Returns all loaded modules.

Return type list

`bpy.utils.preset_find` (*name*, *preset_path*, *display_name=False*)

`bpy.utils.preset_paths(subdir)`

Returns a list of paths for a specific preset.

Parameters `subdir` (*string*) – preset subdirectory (must not be an absolute path).

Returns script paths.

Return type list

`bpy.utils.refresh_script_paths()`

Run this after creating new script paths to update `sys.path`

`bpy.utils.register_module(module, verbose=False)`

`bpy.utils.script_paths(subdir=None, user_pref=True, all=False)`

Returns a list of valid script paths.

Parameters

- `subdir` (*string*) – Optional subdir.
- `user_pref` (*bool*) – Include the user preference script path.
- `all` (*bool*) – Include local, user and system paths rather just the paths blender uses.

Returns script paths.

Return type list

`bpy.utils.smpte_from_frame(frame, fps=None, fps_base=None)`

Returns an SMPTE formatted string from the frame: “HH:MM:SS:FF”.

If `fps` and `fps_base` are not given the current scene is used.

`bpy.utils.smpte_from_seconds(time, fps=None)`

Returns an SMPTE formatted string from the time in seconds: “HH:MM:SS:FF”.

If the `fps` is not given the current scene is used.

`bpy.utils.unregister_module(module, verbose=False)`

`bpy.utils.user_resource(type, path='', create=False)`

Return a user resource path (normally from the users home directory).

Parameters

- `type` (*string*) – Resource type in ['DATAFILES', 'CONFIG', 'SCRIPTS', 'AUTOSAVE'].
- `subdir` (*string*) – Optional subdirectory.
- `create` (*boolean*) – Treat the path as a directory and create it if its not existing.

Returns a path.

Return type string

`bpy.utils.user_script_path()`

2.6 Path Utilities (bpy.path)

This module has a similar scope to `os.path`, containing utility functions for dealing with paths in Blender.

`bpy.path.abspath(path, start=None, library=None)`

Returns the absolute path relative to the current blend file using the “//” prefix.

Parameters

- **start** (*string*) – Relative to this path, when not set the current filename is used.
- **library** (`bpy.types.Library`) – The library this path is from. This is only included for convenience, when the library is not None its path replaces *start*.

`bpy.path.basename` (*path*)

Equivalent to `os.path.basename`, but skips a “//” prefix.

Use for Windows compatibility.

`bpy.path.clean_name` (*name*, *replace*='_')

Returns a name with characters replaced that may cause problems under various circumstances,

such as writing to a file. All characters besides A-Z/a-z, 0-9 are replaced with “_” or the *replace* argument if defined.

`bpy.path.display_name` (*name*)

Creates a display string from *name* to be used menus and the user interface. Capitalize the first letter in all lowercase names, mixed case names are kept as is. Intended for use with filenames and module names.

`bpy.path.display_name_from_filepath` (*name*)

Returns the path stripped of directory and extension, ensured to be utf8 compatible.

`bpy.path.ensure_ext` (*filepath*, *ext*, *case_sensitive*=*False*)

Return the path with the extension added if it is not already set.

Parameters

- **ext** (*string*) – The extension to check for.
- **case_sensitive** (*bool*) – Check for matching case when comparing extensions.

`bpy.path.is_subdir` (*path*, *directory*)

Returns true if *path* in a subdirectory of *directory*. Both paths must be absolute.

`bpy.path.module_names` (*path*, *recursive*=*False*)

Return a list of modules which can be imported from *path*.

Parameters

- **path** (*string*) – a directory to scan.
- **recursive** (*bool*) – Also return submodule names for packages.

Returns a list of string pairs (*module_name*, *module_file*).

Return type list

`bpy.path.relpath` (*path*, *start*=*None*)

Returns the path relative to the current blend file using the “//” prefix.

Parameters **start** (*string*) – Relative to this path, when not set the current filename is used.

`bpy.path.resolve_ncase` (*path*)

Resolve a case insensitive path on a case sensitive system, returning a string with the path if found else return the original path.

2.7 Application Data (bpy.app)

This module contains application values that remain unchanged during runtime.

`bpy.app.debug`

Boolean, set when blender is running in debug mode (started with -d)

- `bpy.app.debug_value`
Int, number which can be set to non-zero values for testing purposes.
- `bpy.app.driver_namespace`
Dictionary for drivers namespace, editable in-place, reset on file load (read-only)
- `bpy.app.tempdir`
String, the temp directory used by blender (read-only)
- `bpy.app.background`
Boolean, True when blender is running without a user interface (started with -b)
- `bpy.app.binary_path`
The location of blenders executable, useful for utilities that spawn new instances
- `bpy.app.build_cflags`
C compiler flags
- `bpy.app.build_cxxflags`
C++ compiler flags
- `bpy.app.build_date`
The date this blender instance was built
- `bpy.app.build_linkflags`
Binary linking flags
- `bpy.app.build_platform`
The platform this blender instance was built for
- `bpy.app.build_revision`
The subversion revision this blender instance was built with
- `bpy.app.build_system`
Build system used
- `bpy.app.build_time`
The time this blender instance was built
- `bpy.app.build_type`
The type of build (Release, Debug)
- `bpy.app.version_char`
The Blender version character (for minor releases)
- `bpy.app.version_cycle`
The release status of this build alpha/beta/rc/release
- `bpy.app.version_string`
The Blender version formatted as a string
- `bpy.app.version`
The Blender version as a tuple of 3 numbers. eg. (2, 50, 11)

2.8 Application Handlers (`bpy.app.handlers`)

This module contains callbacks

2.8.1 Basic Handler Example

This script shows the most simple example of adding a handler.

```
import bpy

def my_handler(scene):
    print("Frame Change", scene.frame_current)

bpy.app.handlers.frame_change_pre.append(my_handler)
```

2.8.2 Persistent Handler Example

By default handlers are freed when loading new files, in some cases you may want the handler stay running across multiple files (when the handler is part of an addon for example).

For this the `bpy.app.handlers.persistent` decorator needs to be used.

```
import bpy
from bpy.app.handlers import persistent

@persistent
def load_handler(dummy):
    print("Load Handler:", bpy.data.filepath)

bpy.app.handlers.load_post.append(load_handler)

bpy.app.handlers.frame_change_post
    Callback list - on frame change for playback and rendering (after)

bpy.app.handlers.frame_change_pre
    Callback list - on frame change for playback and rendering (before)

bpy.app.handlers.load_post
    Callback list - on loading a new blend file (after)

bpy.app.handlers.load_pre
    Callback list - on loading a new blend file (before)

bpy.app.handlers.render_post
    Callback list - on render (after)

bpy.app.handlers.render_pre
    Callback list - on render (before)

bpy.app.handlers.render_stats
    Callback list - on printing render statistics

bpy.app.handlers.save_post
    Callback list - on saving a blend file (after)

bpy.app.handlers.save_pre
    Callback list - on saving a blend file (before)

bpy.app.handlers.scene_update_post
    Callback list - on updating the scenes data (after)
```

`bpy.app.handlers.scene_update_pre`
Callback list - on updating the scenes data (before)

`bpy.app.handlers.persistent`
Function decorator for callback functions not to be removed when loading new files

2.9 Property Definitions (bpy.props)

This module defines properties to extend blenders internal data, the result of these functions is used to assign properties to classes registered with blender and can't be used directly.

2.9.1 Assigning to Existing Classes

Custom properties can be added to any subclass of an ID, Bone and PoseBone.

These properties can be animated, accessed by the user interface and python like blenders existing properties.

```
import bpy

# Assign a custom property to an existing type.
bpy.types.Material.custom_float = bpy.props.FloatProperty(name="Test Prob")

# Test the property is there.
bpy.data.materials[0].custom_float = 5.0
```

2.9.2 Operator Example

A common use of custom properties is for python based Operator classes.

```
import bpy

class DialogOperator(bpy.types.Operator):
    bl_idname = "object.dialog_operator"
    bl_label = "Property Example"

    my_float = bpy.props.FloatProperty(name="Some Floating Point")
    my_bool = bpy.props.BoolProperty(name="Toggle Option")
    my_string = bpy.props.StringProperty(name="String Value")

    def execute(self, context):
        print("Dialog Runs")
        return {'FINISHED'}

    def invoke(self, context, event):
        wm = context.window_manager
        return wm.invoke_props_dialog(self)

bpy.utils.register_class(DialogOperator)

# test call
bpy.ops.object.dialog_operator(' INVOKE_DEFAULT')
```

2.9.3 PropertyGroup Example

PropertyGroups can be used for collecting custom settings into one value to avoid many individual settings mixed in together.

```
import bpy

class MaterialSettings(bpy.types.PropertyGroup):
    my_int = bpy.props.IntProperty()
    my_float = bpy.props.FloatProperty()
    my_string = bpy.props.StringProperty()

bpy.utils.register_class(MaterialSettings)

bpy.types.Material.my_settings = \
    bpy.props.PointerProperty(type=MaterialSettings)

# test the new settings work
material = bpy.data.materials[0]

material.my_settings.my_int = 5
material.my_settings.my_float = 3.0
material.my_settings.my_string = "Foo"
```

2.9.4 Collection Example

Custom properties can be added to any subclass of an ID, Bone and PoseBone.

```
import bpy

# Assign a collection
class SceneSettingItem(bpy.types.PropertyGroup):
    name = bpy.props.StringProperty(name="Test Prop", default="Unknown")
    value = bpy.props.IntProperty(name="Test Prop", default=22)

bpy.utils.register_class(SceneSettingItem)

bpy.types.Scene.my_settings = \
    bpy.props.CollectionProperty(type=SceneSettingItem)

# Assume an armature object selected
print("Adding 3 values!")

my_item = bpy.context.scene.my_settings.add()
my_item.name = "Spam"
my_item.value = 1000

my_item = bpy.context.scene.my_settings.add()
my_item.name = "Eggs"
my_item.value = 30

for my_item in bpy.context.scene.my_settings:
    print(my_item.name, my_item.value)
```

2.9.5 Update Example

It can be useful to perform an action when a property is changed and can be used to update other properties or synchronize with external data.

All properties define update functions except for `CollectionProperty`.

```
import bpy
```

```
def update_func(self, context):  
    print("my test function", self)
```

```
bpy.types.Scene.testprop = bpy.props.FloatProperty(update=update_func)
```

```
bpy.context.scene.testprop = 11.0
```

```
# >>> my test function <bpy_struct, Scene("Scene")>
```

```
bpy.props.BoolProperty(name="", description="", default=False, options={'ANIMATABLE'}, subtype='NONE', update=None)
```

Returns a new boolean property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'NONE'].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

```
bpy.props.BoolVectorProperty(name="", description="", default=(False, False, False), options={'ANIMATABLE'}, subtype='NONE', size=3, update=None)
```

Returns a new vector boolean property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **default** (*sequence*) – sequence of booleans the length of *size*.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['COLOR', 'TRANSLATION', 'DIRECTION', 'VELOCITY', 'ACCELERATION', 'MATRIX', 'EULER', 'QUATERNION', 'AXISANGLE', 'XYZ', 'COLOR_GAMMA', 'LAYER', 'NONE'].
- **size** (*int*) – Vector dimensions in [1, and 32].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

```
bpy.props.CollectionProperty(items, type="", description="", default="", options={'ANIMATABLE'})
```

Returns a new collection property definition.

Parameters

- **type** (*class*) – A subclass of `bpy.types.PropertyGroup`.
- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].

`bpy.props.EnumProperty` (*items*, *name*="", *description*="", *default*="", *options*={'ANIMATABLE'}, *update*=None)

Returns a new enumerator property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **default** (*string or set*) – The default value for this enum, A string when `ENUM_FLAG` is disabled otherwise a set which may only contain string identifiers used in *items*.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE', 'ENUM_FLAG'].
- **items** (*sequence of string triplets or a function*) – sequence of enum items formatted: [(identifier, name, description, number), ...] where the identifier is used for python access and other values are used for the interface. Note the item is optional. For dynamic values a callback can be passed which returns a list in the same format as the static list. This function must take 2 arguments (self, context)
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

`bpy.props.FloatProperty` (*name*="", *description*="", *default*=0.0, *min*=`sys.float_info.min`, *max*=`sys.float_info.max`, *soft_min*=`sys.float_info.min`, *soft_max*=`sys.float_info.max`, *step*=3, *precision*=2, *options*={'ANIMATABLE'}, *subtype*='NONE', *unit*='NONE', *update*=None)

Returns a new float property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'NONE'].
- **unit** (*string*) – Enumerator in ['NONE', 'LENGTH', 'AREA', 'VOLUME', 'ROTATION', 'TIME', 'VELOCITY', 'ACCELERATION'].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

`bpy.props.FloatVectorProperty` (*name*="", *description*="", *default*=(0.0, 0.0, 0.0), *min*=`sys.float_info.min`, *max*=`sys.float_info.max`, *soft_min*=`sys.float_info.min`, *soft_max*=`sys.float_info.max`, *step*=3, *precision*=2, *options*={'ANIMATABLE'}, *subtype*='NONE', *size*=3, *update*=None)

Returns a new vector float property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **default** (*sequence*) – sequence of floats the length of *size*.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['COLOR', 'TRANSLATION', 'DIRECTION', 'VELOCITY', 'ACCELERATION', 'MATRIX', 'EULER', 'QUATERNION', 'AXISANGLE', 'XYZ', 'COLOR_GAMMA', 'LAYER', 'NONE'].
- **unit** (*string*) – Enumerator in ['NONE', 'LENGTH', 'AREA', 'VOLUME', 'ROTATION', 'TIME', 'VELOCITY', 'ACCELERATION'].
- **size** (*int*) – Vector dimensions in [1, and 32].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

```
bpy.props.IntProperty(name="", description="", default=0, min=-sys.maxint, max=sys.maxint,
                    soft_min=-sys.maxint, soft_max=sys.maxint, step=1, options={'ANIMATABLE'},
                    subtype='NONE', update=None)
```

Returns a new int property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'NONE'].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

```
bpy.props.IntVectorProperty(name="", description="", default=(0, 0, 0), min=-sys.maxint,
                          max=sys.maxint, soft_min=-sys.maxint, soft_max=sys.maxint,
                          options={'ANIMATABLE'}, subtype='NONE', size=3, update=None)
```

Returns a new vector int property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **default** (*sequence*) – sequence of ints the length of *size*.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['COLOR', 'TRANSLATION', 'DIRECTION', 'VELOCITY', 'ACCELERATION', 'MATRIX', 'EULER', 'QUATERNION', 'AXISANGLE', 'XYZ', 'COLOR_GAMMA', 'LAYER', 'NONE'].
- **size** (*int*) – Vector dimensions in [1, and 32].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

```
bpy.props.PointerProperty(type="", description="", options={'ANIMATABLE'}, update=None)
```

Returns a new pointer property definition.

Parameters

- **type** (*class*) – A subclass of `bpy.types.PropertyGroup`.
- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

`bpy.props.RemoveProperty` (*attr*)

Removes a dynamically defined property.

Parameters *attr* (*string*) – Property name.

`bpy.props.StringProperty` (*name=""*, *description=""*, *default=""*, *maxlen=0*, *options={'ANIMATABLE'}*, *subtype='NONE'*, *update=None*)

Returns a new string property definition.

Parameters

- **name** (*string*) – Name used in the user interface.
- **description** (*string*) – Text used for the tooltip and api documentation.
- **options** (*set*) – Enumerator in ['HIDDEN', 'SKIP_SAVE', 'ANIMATABLE'].
- **subtype** (*string*) – Enumerator in ['FILE_PATH', 'DIR_PATH', 'FILENAME', 'NONE'].
- **update** (*function*) – function to be called when this value is modified, This function must take 2 values (self, context) and return None.

STANDALONE MODULES

3.1 Math Types & Utilities (mathutils)

This module provides access to matrices, eulers, quaternions and vectors.

```
import mathutils
from math import radians

vec = mathutils.Vector((1.0, 2.0, 3.0))

mat_rot = mathutils.Matrix.Rotation(radians(90.0), 4, 'X')
mat_trans = mathutils.Matrix.Translation(vec)

mat = mat_trans * mat_rot
mat.invert()

mat3 = mat.to_3x3()
quat1 = mat.to_quaternion()
quat2 = mat3.to_quaternion()

quat_diff = quat1.rotation_difference(quat2)

print(quat_diff.angle)
```

class mathutils.Color

This object gives access to Colors in Blender.

```
import mathutils

# color values are represented as RGB values from 0 - 1, this is blue
col = mathutils.Color((0.0, 0.0, 1.0))

# as well as r/g/b attribute access you can adjust them by h/s/v
col.s *= 0.5

# you can access its components by attribute or index
print("Color R:", col.r)
print("Color G:", col[1])
print("Color B:", col[-1])
print("Color HSV: %.2f, %.2f, %.2f", col[:])

# components of an existing color can be set
col[:] = 0.0, 0.5, 1.0
```

```
# components of an existing color can use slice notation to get a tuple
print("Values: %f, %f, %f" % col[:])

# colors can be added and subtracted
col += mathutils.Color((0.25, 0.0, 0.0))

# Color can be multiplied, in this example color is scaled to 0-255
# can printed as integers
print("Color: %d, %d, %d" % (col * 255.0)[:])

# This example prints the color as hexadecimal
print("Hexidecimal: %.2x%.2x%.2x" % (col * 255.0)[:])
```

copy()

Returns a copy of this color.

Returns A copy of the color.

Return type Color

Note: use this to get a copy of a wrapped color with no reference to the original data.

b

Blue color channel.

Type float

g

Green color channel.

Type float

h

HSV Hue component in [0, 1].

Type float

hsv

HSV Values in [0, 1].

Type float triplet

is_wrapped

True when this object wraps external data (readonly).

Type boolean

owner

The item this is wrapping or None (readonly).

r

Red color channel.

Type float

s

HSV Saturation component in [0, 1].

Type float

v

HSV Value component in [0, 1].

Type float

class `mathutils.Euler`

This object gives access to Eulers in Blender.

```
import mathutils
import math

# create a new euler with default axis rotation order
eul = mathutils.Euler((0.0, math.radians(45.0), 0.0), 'XYZ')

# rotate the euler
eul.rotate_axis(math.radians(10.0), 'Z')

# you can access its components by attribute or index
print("Euler X", eul.x)
print("Euler Y", eul[1])
print("Euler Z", eul[-1])

# components of an existing euler can be set
eul[:] = 1.0, 2.0, 3.0

# components of an existing euler can use slice notation to get a tuple
print("Values: %f, %f, %f" % eul[:])

# the order can be set at any time too
eul.order = 'ZYX'

# eulers can be used to rotate vectors
vec = mathutils.Vector((0.0, 0.0, 1.0))
vec.rotate(eul)

# often its useful to convert the euler into a matrix so it can be used as
# transformations with more flexibility
mat_rot = eul.to_matrix()
mat_loc = mathutils.Matrix.Translation((2.0, 3.0, 4.0))
mat = mat_loc * mat_rot.to_4x4()
```

copy()

Returns a copy of this euler.

Returns A copy of the euler.

Return type `Euler`

Note: use this to get a copy of a wrapped euler with no reference to the original data.

make_compatible (*other*)

Make this euler compatible with another, so interpolating between them works as intended.

Note: the rotation order is not taken into account for this function.

rotate (*other*)

Rotates the euler a by another mathutils value.

Parameters **other** (`Euler`, `Quaternion` or `Matrix`) – rotation component of mathutils value

rotate_axis (*axis, angle*)

Rotates the euler a certain amount and returning a unique euler rotation (no 720 degree pitches).

Parameters

- **axis** (*string*) – single character in ['X', 'Y', 'Z'].
- **angle** (*float*) – angle in radians.

to_matrix ()

Return a matrix representation of the euler.

Returns A 3x3 rotation matrix representation of the euler.

Return type `Matrix`

to_quaternion ()

Return a quaternion representation of the euler.

Returns Quaternion representation of the euler.

Return type `Quaternion`

zero ()

Set all values to zero.

is_wrapped

True when this object wraps external data (readonly).

Type `boolean`

order

Euler rotation order.

Type string in ['XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX']

owner

The item this is wrapping or None (readonly).

x

Euler X axis in radians.

Type `float`

y

Euler Y axis in radians.

Type `float`

z

Euler Z axis in radians.

Type `float`

class `mathutils.Matrix`

This object gives access to Matrices in Blender.

```
import mathutils
import math
```

```
# create a location matrix
mat_loc = mathutils.Matrix.Translation((2.0, 3.0, 4.0))
```

```
# create an identity matrix
mat_sca = mathutils.Matrix.Scale(0.5, 4, (0.0, 0.0, 1.0))
```

```

# create a rotation matrix
mat_rot = mathutils.Matrix.Rotation(math.radians(45.0), 4, 'X')

# combine transformations
mat_out = mat_loc * mat_rot * mat_sca
print(mat_out)

# extract components back out of the matrix
loc, rot, sca = mat_out.decompose()
print(loc, rot, sca)

# it can also be useful to access components of a matrix directly
mat = mathutils.Matrix()
mat[0][0], mat[1][0], mat[2][0] = 0.0, 1.0, 2.0

mat[0][0:3] = 0.0, 1.0, 2.0

# each item in a matrix is a vector so vector utility functions can be used
mat[0].xyz = 0.0, 1.0, 2.0

```

classmethod `OrthoProjection` (*axis, size*)

Create a matrix to represent an orthographic projection.

Parameters

- **axis** (string or `Vector`) – Can be any of the following: ['X', 'Y', 'XY', 'XZ', 'YZ'], where a single axis is for a 2D matrix. Or a vector for an arbitrary axis
- **size** (*int*) – The size of the projection matrix to construct [2, 4].

Returns A new projection matrix.

Return type `Matrix`

classmethod `Rotation` (*angle, size, axis*)

Create a matrix representing a rotation.

Parameters

- **angle** (*float*) – The angle of rotation desired, in radians.
- **size** (*int*) – The size of the rotation matrix to construct [2, 4].
- **axis** (string or `Vector`) – a string in ['X', 'Y', 'Z'] or a 3D Vector Object (optional when size is 2).

Returns A new rotation matrix.

Return type `Matrix`

classmethod `Scale` (*factor, size, axis*)

Create a matrix representing a scaling.

Parameters

- **factor** (*float*) – The factor of scaling to apply.
- **size** (*int*) – The size of the scale matrix to construct [2, 4].
- **axis** (`Vector`) – Direction to influence scale. (optional).

Returns A new scale matrix.

Return type `Matrix`

classmethod `Shear` (*plane, size, factor*)

Create a matrix to represent an shear transformation.

Parameters

- **plane** (*string*) – Can be any of the following: ['X', 'Y', 'XY', 'XZ', 'YZ'], where a single axis is for a 2D matrix only.
- **size** (*int*) – The size of the shear matrix to construct [2, 4].
- **factor** (*float or float pair*) – The factor of shear to apply. For a 3 or 4 *size* matrix pass a pair of floats corresponding with the *plane* axis.

Returns A new shear matrix.

Return type `Matrix`

classmethod `Translation` (*vector*)

Create a matrix representing a translation.

Parameters **vector** (`Vector`) – The translation vector.

Returns An identity matrix with a translation.

Return type `Matrix`

copy ()

Returns a copy of this matrix.

Returns an instance of itself

Return type `Matrix`

decompose ()

Return the location, rotaion and scale components of this matrix.

Returns loc, rot, scale triple.

Return type (`Vector, Quaternion, Vector`)

determinant ()

Return the determinant of a matrix.

Returns Return a the determinant of a matrix.

Return type float

See Also:

<<http://en.wikipedia.org/wiki/Determinant>>

identity ()

Set the matrix to the identity matrix.

Note: An object with zero location and rotation, a scale of one, will have an identity matrix.

See Also:

<http://en.wikipedia.org/wiki/Identity_matrix>

invert ()

Set the matrix to its inverse.

See Also:

<http://en.wikipedia.org/wiki/Inverse_matrix>

inverted()

Return an inverted copy of the matrix.

Returns the inverted matrix.

Return type `Matrix`

lerp (*other*, *factor*)

Returns the interpolation of two matrices.

Parameters

- **other** (`Matrix`) – value to interpolate with.
- **factor** (*float*) – The interpolation value in [0.0, 1.0].

Returns The interpolated rotation.

Return type `Matrix`

resize_4x4()

Resize the matrix to 4x4.

rotate (*other*)

Rotates the matrix a by another mathutils value.

Parameters other (`Euler`, `Quaternion` or `Matrix`) – rotation component of mathutils value

Note: If any of the columns are not unit length this may not have desired results.

to_3x3()

Return a 3x3 copy of this matrix.

Returns a new matrix.

Return type `Matrix`

to_4x4()

Return a 4x4 copy of this matrix.

Returns a new matrix.

Return type `Matrix`

to_euler (*order*, *euler_compat*)

Return an Euler representation of the rotation matrix (3x3 or 4x4 matrix only).

Parameters

- **order** (*string*) – Optional rotation order argument in ['XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX'].
- **euler_compat** (`Euler`) – Optional euler argument the new euler will be made compatible with (no axis flipping between them). Useful for converting a series of matrices to animation curves.

Returns Euler representation of the matrix.

Return type `Euler`

to_quaternion()

Return a quaternion representation of the rotation matrix.

Returns Quaternion representation of the rotation matrix.

Return type `Quaternion`

to_scale()

Return a the scale part of a 3x3 or 4x4 matrix.

Returns Return a the scale of a matrix.

Return type `Vector`

Note: This method does not return negative a scale on any axis because it is not possible to obtain this data from the matrix alone.

to_translation()

Return a the translation part of a 4 row matrix.

Returns Return a the translation of a matrix.

Return type `Vector`

transpose()

Set the matrix to its transpose.

See Also:

[<http://en.wikipedia.org/wiki/Transpose>](http://en.wikipedia.org/wiki/Transpose)

transposed()

Return a new, transposed matrix.

Returns a transposed matrix

Return type `Matrix`

zero()

Set all the matrix values to zero.

Returns an instance of itself

Return type `Matrix`

col_size

The column size of the matrix (readonly).

Type `int`

is_negative

True if this matrix results in a negative scale, 3x3 and 4x4 only, (readonly).

Type `bool`

is_orthogonal

True if this matrix is orthogonal, 3x3 and 4x4 only, (readonly).

Type `bool`

is_wrapped

True when this object wraps external data (readonly).

Type `boolean`

median_scale

The average scale applied to each axis (readonly).

Type `float`

owner

The item this is wrapping or None (readonly).

row_size

The row size of the matrix (readonly).

Type int

class mathutils.Quaternion

This object gives access to Quaternions in Blender.

```
import mathutils
import math
```

```
# a new rotation 90 degrees about the Y axis
quat_a = mathutils.Quaternion((0.7071068, 0.0, 0.7071068, 0.0))

# passing values to Quaternion's directly can be confusing so axis, angle
# is supported for initializing too
quat_b = mathutils.Quaternion((0.0, 1.0, 0.0), math.radians(90.0))

print("Check quaternions match", quat_a == quat_b)

# like matrices, quaternions can be multiplied to accumulate rotational values
quat_a = mathutils.Quaternion((0.0, 1.0, 0.0), math.radians(90.0))
quat_b = mathutils.Quaternion((0.0, 0.0, 1.0), math.radians(45.0))
quat_out = quat_a * quat_b

# print the quat, euler degrees for mear mortals and (axis, angle)
print("Final Rotation:")
print(quat_out)
print("%.2f, %.2f, %.2f" % tuple(math.degrees(a) for a in quat_out.to_euler()))
print("%.2f, %.2f, %.2f), %.2f" % (quat_out.axis[:] +
                                (math.degrees(quat_out.angle), )))
```

conjugate()

Set the quaternion to its conjugate (negate x, y, z).

conjugated()

Return a new conjugated quaternion.

Returns a new quaternion.

Return type Quaternion

copy()

Returns a copy of this quaternion.

Returns A copy of the quaternion.

Return type Quaternion

Note: use this to get a copy of a wrapped quaternion with no reference to the original data.

cross (*other*)

Return the cross product of this quaternion and another.

Parameters *other* (Quaternion) – The other quaternion to perform the cross product with.

Returns The cross product.

Return type Quaternion

dot (*other*)

Return the dot product of this quaternion and another.

Parameters **other** (`Quaternion`) – The other quaternion to perform the dot product with.

Returns The dot product.

Return type `Quaternion`

identity ()

Set the quaternion to an identity quaternion.

Returns an instance of itself.

Return type `Quaternion`

invert ()

Set the quaternion to its inverse.

inverted ()

Return a new, inverted quaternion.

Returns the inverted value.

Return type `Quaternion`

negate ()

Set the quaternion to its negative.

Returns an instance of itself.

Return type `Quaternion`

normalize ()

Normalize the quaternion.

normalized ()

Return a new normalized quaternion.

Returns a normalized copy.

Return type `Quaternion`

rotate (*other*)

Rotates the quaternion a by another mathutils value.

Parameters **other** (`Euler`, `Quaternion` or `Matrix`) – rotation component of mathutils value

rotation_difference (*other*)

Returns a quaternion representing the rotational difference.

Parameters **other** (`Quaternion`) – second quaternion.

Returns the rotational difference between the two quat rotations.

Return type `Quaternion`

slerp (*other, factor*)

Returns the interpolation of two quaternions.

Parameters

- **other** (`Quaternion`) – value to interpolate with.
- **factor** (`float`) – The interpolation value in [0.0, 1.0].

Returns The interpolated rotation.

Return type `Quaternion`

to_axis_angle ()

Return the axis, angle representation of the quaternion.

Returns axis, angle.

Return type (`Vector`, float) pair

to_euler (*order*, *euler_compat*)

Return Euler representation of the quaternion.

Parameters

- **order** (*string*) – Optional rotation order argument in ['XYZ', 'XZY', 'YXZ', 'YZX', 'ZXY', 'ZYX'].
- **euler_compat** (`Euler`) – Optional euler argument the new euler will be made compatible with (no axis flipping between them). Useful for converting a series of matrices to animation curves.

Returns Euler representation of the quaternion.

Return type `Euler`

to_matrix ()

Return a matrix representation of the quaternion.

Returns A 3x3 rotation matrix representation of the quaternion.

Return type `Matrix`

angle

angle of the quaternion.

Type float

axis

quaternion axis as a vector.

Type `Vector`

is_wrapped

True when this object wraps external data (readonly).

Type boolean

magnitude

Size of the quaternion (readonly).

Type float

owner

The item this is wrapping or None (readonly).

w

Quaternion W value.

Type float

x

Quaternion X axis.

Type float

y

Quaternion Y axis.

Type float

z

Quaternion Z axis.

Type float

class `mathutils.Vector`

This object gives access to Vectors in Blender.

```
import mathutils

# zero length vector
vec = mathutils.Vector((0.0, 0.0, 1.0))

# unit length vector
vec_a = vec.copy().normalize()

vec_b = mathutils.Vector((0.0, 1.0, 2.0))

vec2d = mathutils.Vector((1.0, 2.0))
vec3d = mathutils.Vector((1.0, 0.0, 0.0))
vec4d = vec_a.to_4d()

# other mathutils types
quat = mathutils.Quaternion()
matrix = mathutils.Matrix()

# Comparison operators can be done on Vector classes:

# greater and less then test vector length.
vec_a > vec_b
vec_a >= vec_b
vec_a < vec_b
vec_a <= vec_b

# ==, != test vector values e.g. 1,2,3 != 3,2,1 even if they are the same length
vec_a == vec_b
vec_a != vec_b

# Math can be performed on Vector classes
vec_a + vec_b
vec_a - vec_b
vec_a * vec_b
vec_a * 10.0
matrix * vec_a
quat * vec_a
vec_a * vec_b
-vec_a

# You can access a vector object like a sequence
x = vec_a[0]
len(vec)
vec_a[:] = vec_b
vec_a[:] = 1.0, 2.0, 3.0
vec2d[:] = vec3d[:2]
```

```
# Vectors support 'swizzle' operations
# See http://en.wikipedia.org/wiki/Swizzling_(computer_graphics)
vec.xyz = vec.zyx
vec.xy = vec4d.zw
vec.xyz = vec4d.wzz
vec4d.wxyz = vec.yxyx
```

angle (*other, fallback*)

Return the angle between two vectors.

Parameters

- **other** (`Vector`) – another vector to compare the angle with
- **fallback** (*any*) – return this value when the angle cant be calculated (zero length vector)

Returns angle in radians or fallback when given

Return type float

Note: Zero length vectors raise an `AttributeError`.

copy ()

Returns a copy of this vector.

Returns A copy of the vector.

Return type `Vector`

Note: use this to get a copy of a wrapped vector with no reference to the original data.

cross (*other*)

Return the cross product of this vector and another.

Parameters **other** (`Vector`) – The other vector to perform the cross product with.

Returns The cross product.

Return type `Vector`

Note: both vectors must be 3D

dot (*other*)

Return the dot product of this vector and another.

Parameters **other** (`Vector`) – The other vector to perform the dot product with.

Returns The dot product.

Return type `Vector`

lerp (*other, factor*)

Returns the interpolation of two vectors.

Parameters

- **other** (`Vector`) – value to interpolate with.
- **factor** (*float*) – The interpolation value in [0.0, 1.0].

Returns The interpolated rotation.

Return type `Vector`

negate ()

Set all values to their negative.

Returns an instance of itself

Return type `Vector`

normalize ()

Normalize the vector, making the length of the vector always 1.0.

<p>Warning: Normalizing a vector where all values are zero results in all axis having a nan value (not a number).</p>
--

Note: Normalize works for vectors of all sizes, however 4D Vectors w axis is left untouched.

normalized ()

Return a new, normalized vector.

Returns a normalized copy of the vector

Return type `Vector`

project (*other*)

Return the projection of this vector onto the *other*.

Parameters **other** (`Vector`) – second vector.

Returns the parallel projection vector

Return type `Vector`

reflect (*mirror*)

Return the reflection vector from the *mirror* argument.

Parameters **mirror** (`Vector`) – This vector could be a normal from the reflecting surface.

Returns The reflected vector matching the size of this vector.

Return type `Vector`

resize_2d ()

Resize the vector to 2D (x, y).

Returns an instance of itself

Return type `Vector`

resize_3d ()

Resize the vector to 3D (x, y, z).

Returns an instance of itself

Return type `Vector`

resize_4d ()

Resize the vector to 4D (x, y, z, w).

Returns an instance of itself

Return type `Vector`

rotate (*other*)

Return vector by a rotation value.

Parameters other (*Euler*, *Quaternion* or *Matrix*) – rotation component of mathutils value

rotation_difference (*other*)

Returns a quaternion representing the rotational difference between this vector and another.

Parameters other (*Vector*) – second vector.

Returns the rotational difference between the two vectors.

Return type *Quaternion*

Note: 2D vectors raise an *AttributeError*.

to_2d()

Return a 2d copy of the vector.

Returns a new vector

Return type *Vector*

to_3d()

Return a 3d copy of the vector.

Returns a new vector

Return type *Vector*

to_4d()

Return a 4d copy of the vector.

Returns a new vector

Return type *Vector*

to_track_quat (*track*, *up*)

Return a quaternion rotation from the vector and the track and up axis.

Parameters

- **track** (*string*) – Track axis in ['X', 'Y', 'Z', '-X', '-Y', '-Z'].
- **up** (*string*) – Up axis in ['X', 'Y', 'Z'].

Returns rotation from the vector and the track and up axis.

Return type *Quaternion*

to_tuple (*precision=-1*)

Return this vector as a tuple with.

Parameters precision (*int*) – The number to round the value to in [-1, 21].

Returns the values of the vector rounded by *precision*

Return type tuple

zero()

Set all values to zero.

is_wrapped

True when this object wraps external data (readonly).

Type boolean

length

Vector Length.

Type float

length_squared

Vector length squared ($v \cdot v$).

Type float

magnitude

Vector Length.

Type float

owner

The item this is wrapping or None (readonly).

w

Vector W axis (4D Vectors only).

Type float

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x
Vector X axis.
Type float

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Vector Y axis.
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3.2 Geometry Utilities (mathutils.geometry)

The Blender geometry module

`mathutils.geometry.area_tri` (*v1*, *v2*, *v3*)

Returns the area size of the 2D or 3D triangle defined.

Parameters

- **v1** (`mathutils.Vector`) – Point1
- **v2** (`mathutils.Vector`) – Point2
- **v3** (`mathutils.Vector`) – Point3

Return type float

`mathutils.geometry.barycentric_transform` (*point*, *tri_a1*, *tri_a2*, *tri_a3*, *tri_b1*, *tri_b2*,
tri_b3)

Return a transformed point, the transformation is defined by 2 triangles.

Parameters

- **point** (`mathutils.Vector`) – The point to transform.
- **tri_a1** (`mathutils.Vector`) – source triangle vertex.
- **tri_a2** (`mathutils.Vector`) – source triangle vertex.
- **tri_a3** (`mathutils.Vector`) – source triangle vertex.
- **tri_b1** – target triangle vertex.
- **tri_a2** – target triangle vertex.

- **tri_a3** – target triangle vertex.

Returns The transformed point

Return type `mathutils.Vector`'s

`mathutils.geometry.box_pack_2d` (*boxes*)

Returns the normal of the 3D tri or quad.

Parameters **boxes** (*list*) – list of boxes, each box is a list where the first 4 items are [x, y, width, height, ...] other items are ignored.

Returns the width and height of the packed bounding box

Return type tuple, pair of floats

`mathutils.geometry.distance_point_to_plane` (*pt, plane_co, plane_no*)

Returns the signed distance between a point and a plane (negative when below the normal).

Parameters

- **pt** (`mathutils.Vector`) – Point
- **plane_co** (`mathutils.Vector`) – First point of the quad
- **plane_no** (`mathutils.Vector`) – Second point of the quad

Return type float

`mathutils.geometry.interpolate_bezier` (*knot1, handle1, handle2, knot2, resolution*)

Interpolate a bezier spline segment.

Parameters

- **knot1** (`mathutils.Vector`) – First bezier spline point.
- **handle1** (`mathutils.Vector`) – First bezier spline handle.
- **handle2** (`mathutils.Vector`) – Second bezier spline handle.
- **knot2** (`mathutils.Vector`) – Second bezier spline point.
- **resolution** (*int*) – Number of points to return.

Returns The interpolated points

Return type list of `mathutils.Vector`'s

`mathutils.geometry.intersect_line_line` (*v1, v2, v3, v4*)

Returns a tuple with the points on each line respectively closest to the other.

Parameters

- **v1** (`mathutils.Vector`) – First point of the first line
- **v2** (`mathutils.Vector`) – Second point of the first line
- **v3** (`mathutils.Vector`) – First point of the second line
- **v4** (`mathutils.Vector`) – Second point of the second line

Return type tuple of `mathutils.Vector`'s

`mathutils.geometry.intersect_line_line_2d` (*lineA_p1, lineA_p2, lineB_p1, lineB_p2*)

Takes 2 lines (as 4 vectors) and returns a vector for their point of intersection or None.

Parameters

- **lineA_p1** (`mathutils.Vector`) – First point of the first line

- **lineA_p2** (`mathutils.Vector`) – Second point of the first line
- **lineB_p1** (`mathutils.Vector`) – First point of the second line
- **lineB_p2** (`mathutils.Vector`) – Second point of the second line

Returns The point of intersection or None when not found

Return type `mathutils.Vector` or None

`mathutils.geometry.intersect_line_plane` (*line_a, line_b, plane_co, plane_no, no_flip=False*)
Takes 2 lines (as 4 vectors) and returns a vector for their point of intersection or None.

Parameters

- **line_a** (`mathutils.Vector`) – First point of the first line
- **line_b** (`mathutils.Vector`) – Second point of the first line
- **plane_co** (`mathutils.Vector`) – A point on the plane
- **plane_no** (`mathutils.Vector`) – The direction the plane is facing
- **no_flip** (*:boolean*) – Always return an intersection on the direction defined by line_a -> line_b

Returns The point of intersection or None when not found

Return type `mathutils.Vector` or None

`mathutils.geometry.intersect_line_sphere` (*line_a, line_b, sphere_co, sphere_radius, clip=True*)

Takes a lines (as 2 vectors), a sphere as a point and a radius and returns the intersection

Parameters

- **line_a** (`mathutils.Vector`) – First point of the first line
- **line_b** (`mathutils.Vector`) – Second point of the first line
- **sphere_co** (`mathutils.Vector`) – The center of the sphere
- **sphere_radius** (*sphere_radius*) – Radius of the sphere

Returns The intersection points as a pair of vectors or None when there is no intersection

Return type A tuple pair containing `mathutils.Vector` or None

`mathutils.geometry.intersect_line_sphere_2d` (*line_a, line_b, sphere_co, sphere_radius, clip=True*)

Takes a lines (as 2 vectors), a sphere as a point and a radius and returns the intersection

Parameters

- **line_a** (`mathutils.Vector`) – First point of the first line
- **line_b** (`mathutils.Vector`) – Second point of the first line
- **sphere_co** (`mathutils.Vector`) – The center of the sphere
- **sphere_radius** (*sphere_radius*) – Radius of the sphere

Returns The intersection points as a pair of vectors or None when there is no intersection

Return type A tuple pair containing `mathutils.Vector` or None

`mathutils.geometry.intersect_point_line` (*pt, line_p1, line_p2*)

Takes a point and a line and returns a tuple with the closest point on the line and its distance from the first point of the line as a percentage of the length of the line.

Parameters

- **pt** (`mathutils.Vector`) – Point
- **line_p1** (`mathutils.Vector`) – First point of the line
- **line_p2** (`mathutils.Vector`) – Second point of the line

Return type (`mathutils.Vector`, float)

`mathutils.geometry.intersect_point_quad_2d` (*pt, quad_p1, quad_p2, quad_p3, quad_p4*)

Takes 5 vectors (using only the x and y coordinates): one is the point and the next 4 define the quad, only the x and y are used from the vectors. Returns 1 if the point is within the quad, otherwise 0.

Parameters

- **pt** (`mathutils.Vector`) – Point
- **quad_p1** (`mathutils.Vector`) – First point of the quad
- **quad_p2** (`mathutils.Vector`) – Second point of the quad
- **quad_p3** (`mathutils.Vector`) – Third point of the quad
- **quad_p4** (`mathutils.Vector`) – Forth point of the quad

Return type int

`mathutils.geometry.intersect_point_tri_2d` (*pt, tri_p1, tri_p2, tri_p3*)

Takes 4 vectors (using only the x and y coordinates): one is the point and the next 3 define the triangle. Returns 1 if the point is within the triangle, otherwise 0.

Parameters

- **pt** – Point
- **tri_p1** (`mathutils.Vector`) – First point of the triangle
- **tri_p2** (`mathutils.Vector`) – Second point of the triangle
- **tri_p3** (`mathutils.Vector`) – Third point of the triangle

Return type int

`mathutils.geometry.intersect_ray_tri` (*v1, v2, v3, ray, orig, clip=True*)

Returns the intersection between a ray and a triangle, if possible, returns None otherwise.

Parameters

- **v1** (`mathutils.Vector`) – Point1
- **v2** (`mathutils.Vector`) – Point2
- **v3** (`mathutils.Vector`) – Point3
- **ray** (`mathutils.Vector`) – Direction of the projection
- **orig** (`mathutils.Vector`) – Origin
- **clip** (*boolean*) – When False, don't restrict the intersection to the area of the triangle, use the infinite plane defined by the triangle.

Returns The point of intersection or None if no intersection is found

Return type `mathutils.Vector` or None

`mathutils.geometry.normal` (*v1, v2, v3, v4=None*)

Returns the normal of the 3D tri or quad.

Parameters

- **v1** (`mathutils.Vector`) – Point1
- **v2** (`mathutils.Vector`) – Point2
- **v3** (`mathutils.Vector`) – Point3
- **v4** (`mathutils.Vector`) – Point4 (optional)

Return type `mathutils.Vector`

`mathutils.geometry.tessellate_polygon` (*veclist_list*)

Takes a list of polylines (each point a vector) and returns the point indices for a polyline filled with triangles.

Parameters `veclist_list` – list of polylines

Return type `list`

3.3 OpenGL Wrapper (bgl)

This module wraps OpenGL constants and functions, making them available from within Blender Python.

The complete list can be retrieved from the module itself, by listing its contents: `dir(bgl)`. A simple search on the net can point to more than enough material to teach OpenGL programming, from books to many collections of tutorials.

The “red book”: “{OpenGL Programming Guide: The Official Guide to Learning OpenGL}” and the online NeHe tutorials are two of the best resources.

Note: You can use the `Image` type to load and set textures. See `Image.gl_load` and `Image.gl_load`, for example. OpenGL.org [NeHe](http://NeHe.com) [GameDev](http://GameDev.com)

glAccum(*op*, *value*):

Operate on the accumulation buffer.

See Also:

[OpenGL Docs](#)

Parameters

- **op** (*Enumerated constant*) – The accumulation buffer operation.
- **value** (*float*) – a value used in the accumulation buffer operation.

glAlphaFunc(*func*, *ref*):

Specify the alpha test function.

See Also:

[OpenGL Docs](#)

Parameters

- **func** (*Enumerated constant*) – Specifies the alpha comparison function.
- **ref** (*float*) – The reference value that incoming alpha values are compared to. Clamped between 0 and 1.

glAreTexturesResident(*n*, *textures*, *residences*):

Determine if textures are loaded in texture memory

See Also:

[OpenGL Docs](#)**Parameters**

- **n** (*int*) – Specifies the number of textures to be queried.
- **textures** (`bgl.Buffer` object I{type `GL_INT`}) – Specifies an array containing the names of the textures to be queried
- **residences** (`bgl.Buffer` object I{type `GL_INT`}(boolean)) – An array in which the texture residence status is returned. The residence status of a texture named by an element of textures is returned in the corresponding element of residences.

glBegin(mode) :

Delimit the vertices of a primitive or a group of like primitives

See Also:[OpenGL Docs](#)

Parameters mode (*Enumerated constant*) – Specifies the primitive that will be create from vertices between glBegin and glEnd.

glBindTexture(target, texture) :

Bind a named texture to a texturing target

See Also:[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies the target to which the texture is bound.
- **texture** (*unsigned int*) – Specifies the name of a texture.

glBitmap(width, height, xorig, yorig, xmove, ymove, bitmap) :

Draw a bitmap

See Also:[OpenGL Docs](#)**Parameters**

- **height** (*width*,) – Specify the pixel width and height of the bitmap image.
- **yorig** (*xorig*,) – Specify the location of the origin in the bitmap image. The origin is measured from the lower left corner of the bitmap, with right and up being the positive axes.
- **ymove** (*xmove*,) – Specify the x and y offsets to be added to the current raster position after the bitmap is drawn.
- **bitmap** (`bgl.Buffer` object I{type `GL_BYTE`}) – Specifies the address of the bitmap image.

glBlendFunc(sfactor, dfactor) :

Specify pixel arithmetic

See Also:[OpenGL Docs](#)**Parameters**

- **sfactor** (*Enumerated constant*) – Specifies how the red, green, blue, and alpha source blending factors are computed.
- **dfactor** (*Enumerated constant*) – Specifies how the red, green, blue, and alpha destination blending factors are computed.

glCallList (list) :

Execute a display list

See Also:

[OpenGL Docs](#)

Parameters list (*unsigned int*) – Specifies the integer name of the display list to be executed.

glCallLists (n, type, lists) :

Execute a list of display lists

See Also:

[OpenGL Docs](#)

Parameters

- **n** (*int*) – Specifies the number of display lists to be executed.
- **type** (*Enumerated constant*) – Specifies the type of values in lists.
- **lists** (`ogl.Buffer` object) – Specifies the address of an array of name offsets in the display list. The pointer type is void because the offsets can be bytes, shorts, ints, or floats, depending on the value of type.

glClear (mask) :

Clear buffers to preset values

See Also:

[OpenGL Docs](#)

Parameters mask (*Enumerated constant(s)*) – Bitwise OR of masks that indicate the buffers to be cleared.

glClearAccum (red, green, blue, alpha) :

Specify clear values for the accumulation buffer

See Also:

[OpenGL Docs](#)

Parameters green, blue, alpha (*red,*) – Specify the red, green, blue, and alpha values used when the accumulation buffer is cleared. The initial values are all 0.

glClearColor (red, green, blue, alpha) :

Specify clear values for the color buffers

See Also:

[OpenGL Docs](#)

Parameters green, blue, alpha (*red,*) – Specify the red, green, blue, and alpha values used when the color buffers are cleared. The initial values are all 0.

glClearDepth (depth) :

Specify the clear value for the depth buffer

See Also:

[OpenGL Docs](#)

Parameters *depth* (*int*) – Specifies the depth value used when the depth buffer is cleared. The initial value is 1.

glClearColor (c) :

Specify the clear value for the color index buffers

See Also:

[OpenGL Docs](#)

Parameters *c* (*float*) – Specifies the index used when the color index buffers are cleared. The initial value is 0.

glClearStencil (s) :

Specify the clear value for the stencil buffer

See Also:

[OpenGL Docs](#)

Parameters *s* (*int*) – Specifies the index used when the stencil buffer is cleared. The initial value is 0.

glClipPlane (plane, equation) :

Specify a plane against which all geometry is clipped

See Also:

[OpenGL Docs](#)

Parameters

- **plane** (*Enumerated constant*) – Specifies which clipping plane is being positioned.
- **equation** (`bg1.Buffer object I{type GL_FLOAT}(double)`) – Specifies the address of an array of four double-precision floating-point values. These values are interpreted as a plane equation.

glColor (red, green, blue, alpha) :

B{glColor3b, glColor3d, glColor3f, glColor3i, glColor3s, glColor3ub, glColor3ui, glColor3us, glColor4b, glColor4d, glColor4f, glColor4i, glColor4s, glColor4ub, glColor4ui, glColor4us, glColor3bv, glColor3dv, glColor3fv, glColor3iv, glColor3sv, glColor3ubv, glColor3uiv, glColor3usv, glColor4bv, glColor4dv, glColor4fv, glColor4iv, glColor4sv, glColor4ubv, glColor4uiv, glColor4usv}

Set a new color.

See Also:

[OpenGL Docs](#)

Parameters

- **green, blue** (*red,*) – Specify new red, green, and blue values for the current color.
- **alpha** – Specifies a new alpha value for the current color. Included only in the four-argument glColor4 commands. (With '4' colors only)

glColorMask(*red, green, blue, alpha*):

Enable and disable writing of frame buffer color components

See Also:

[OpenGL Docs](#)

Parameters *green, blue, alpha* (*red*,) – Specify whether red, green, blue, and alpha can or cannot be written into the frame buffer. The initial values are all `GL_TRUE`, indicating that the color components can be written.

glColorMaterial(*face, mode*):

Cause a material color to track the current color

See Also:

[OpenGL Docs](#)

Parameters

- **face** (*Enumerated constant*) – Specifies whether front, back, or both front and back material parameters should track the current color.
- **mode** (*Enumerated constant*) – Specifies which of several material parameters track the current color.

glCopyPixels(*x, y, width, height, type*):

Copy pixels in the frame buffer

See Also:

[OpenGL Docs](#)

Parameters

- **y** (*x*,) – Specify the window coordinates of the lower left corner of the rectangular region of pixels to be copied.
- **width,height** – Specify the dimensions of the rectangular region of pixels to be copied. Both must be non-negative.
- **type** (*Enumerated constant*) – Specifies whether color values, depth values, or stencil values are to be copied.

def glCopyTexImage2D(target, level, internalformat, x, y, width, height, border):

Copy pixels into a 2D texture image

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies the target texture.
- **level** (*int*) – Specifies the level-of-detail number. Level 0 is the base image level. Level n is the nth mipmap reduction image.
- **internalformat** (*int*) – Specifies the number of color components in the texture.
- **y** (*x*,) – Specify the window coordinates of the first pixel that is copied from the frame buffer. This location is the lower left corner of a rectangular block of pixels.

- **width** (*int*) – Specifies the width of the texture image. Must be $2n+2(\text{border})$ for some integer n . All implementations support texture images that are at least 64 texels wide.
- **height** (*int*) – Specifies the height of the texture image. Must be $2m+2(\text{border})$ for some integer m . All implementations support texture images that are at least 64 texels high.
- **border** (*int*) – Specifies the width of the border. Must be either 0 or 1.

glCullFace (mode) :

Specify whether front- or back-facing facets can be culled

See Also:

[OpenGL Docs](#)

Parameters mode (*Enumerated constant*) – Specifies whether front- or back-facing facets are candidates for culling.

glDeleteLists (list, range) :

Delete a contiguous group of display lists

See Also:

[OpenGL Docs](#)

Parameters

- **list** (*unsigned int*) – Specifies the integer name of the first display list to delete
- **range** (*int*) – Specifies the number of display lists to delete

glDeleteTextures (n, textures) :

Delete named textures

See Also:

[OpenGL Docs](#)

Parameters

- **n** (*int*) – Specifies the number of textures to be deleted
- **textures** (`ogl.Buffer I{GL_INT}`) – Specifies an array of textures to be deleted

glDepthFunc (func) :

Specify the value used for depth buffer comparisons

See Also:

[OpenGL Docs](#)

Parameters func (*Enumerated constant*) – Specifies the depth comparison function.

glDepthMask (flag) :

Enable or disable writing into the depth buffer

See Also:

[OpenGL Docs](#)

Parameters flag (*int (boolean)*) – Specifies whether the depth buffer is enabled for writing. If flag is `GL_FALSE`, depth buffer writing is disabled. Otherwise, it is enabled. Initially, depth buffer writing is enabled.

glDepthRange (zNear, zFar) :

Specify mapping of depth values from normalized device coordinates to window coordinates

See Also:

[OpenGL Docs](#)

Parameters

- **zNear** (*int*) – Specifies the mapping of the near clipping plane to window coordinates. The initial value is 0.
- **zFar** (*int*) – Specifies the mapping of the far clipping plane to window coordinates. The initial value is 1.

glDisable (cap) :

Disable server-side GL capabilities

See Also:

[OpenGL Docs](#)

Parameters cap (*Enumerated constant*) – Specifies a symbolic constant indicating a GL capability.

glDrawBuffer (mode) :

Specify which color buffers are to be drawn into

See Also:

[OpenGL Docs](#)

Parameters mode (*Enumerated constant*) – Specifies up to four color buffers to be drawn into.

glDrawPixels (width, height, format, type, pixels) :

Write a block of pixels to the frame buffer

See Also:

[OpenGL Docs](#)

Parameters

- **height** (*width*,) – Specify the dimensions of the pixel rectangle to be written into the frame buffer.
- **format** (*Enumerated constant*) – Specifies the format of the pixel data.
- **type** (*Enumerated constant*) – Specifies the data type for pixels.
- **pixels** (`bgl.Buffer` object) – Specifies a pointer to the pixel data.

glEdgeFlag (flag) :

B{glEdgeFlag, glEdgeFlagv}

Flag edges as either boundary or non-boundary

See Also:

[OpenGL Docs](#)

Parameters flag (*Depends of function prototype*) – Specifies the current edge flag value. The initial value is GL_TRUE.

glEnable (cap) :

Enable server-side GL capabilities

See Also:

[OpenGL Docs](#)

Parameters cap (*Enumerated constant*) – Specifies a symbolic constant indicating a GL capability.

glEnd () :

Delimit the vertices of a primitive or group of like primitives

See Also:

[OpenGL Docs](#)

glEndList () :

Create or replace a display list

See Also:

[OpenGL Docs](#)

glEvalCoord (u, v) :

B{glEvalCoord1d, glEvalCoord1f, glEvalCoord2d, glEvalCoord2f, glEvalCoord1dv, glEvalCoord1fv, glEvalCoord2dv, glEvalCoord2fv}

Evaluate enabled one- and two-dimensional maps

See Also:

[OpenGL Docs](#)

Parameters

- **u** (*Depends on function prototype.*) – Specifies a value that is the domain coordinate *u* to the basis function defined in a previous `glMap1` or `glMap2` command. If the function prototype ends in ‘*v*’ then *u* specifies a pointer to an array containing either one or two domain coordinates. The first coordinate is *u*. The second coordinate is *v*, which is present only in `glEvalCoord2` versions.
- **v** (*Depends on function prototype. (only with ‘2’ prototypes)*) – Specifies a value that is the domain coordinate *v* to the basis function defined in a previous `glMap2` command. This argument is not present in a `glEvalCoord1` command.

glEvalMesh (mode, i1, i2) :

B{glEvalMesh1 or glEvalMesh2}

Compute a one- or two-dimensional grid of points or lines

See Also:

[OpenGL Docs](#)

Parameters

- **mode** (*Enumerated constant*) – In `glEvalMesh1`, specifies whether to compute a one-dimensional mesh of points or lines.
- **i2** (*i1*) – Specify the first and last integer values for the grid domain variable *i*.

glEvalPoint (i, j) :

B{glEvalPoint1 and glEvalPoint2}

Generate and evaluate a single point in a mesh

See Also:

[OpenGL Docs](#)

Parameters

- **i** (*int*) – Specifies the integer value for grid domain variable i.
- **j** (*int (only with '2' prototypes)*) – Specifies the integer value for grid domain variable j (glEvalPoint2 only).

glFeedbackBuffer (size, type, buffer) :

Controls feedback mode

See Also:

[OpenGL Docs](#)

Parameters

- **size** (*int*) – Specifies the maximum number of values that can be written into buffer.
- **type** (*Enumerated constant*) – Specifies a symbolic constant that describes the information that will be returned for each vertex.
- **buffer** (*OpenGL.Buffer object I{GL_FLOAT}*) – Returns the feedback data.

glFinish () :

Block until all GL execution is complete

See Also:

[OpenGL Docs](#)

glFlush () :

Force Execution of GL commands in finite time

See Also:

[OpenGL Docs](#)

glFog (pname, param) :

B{glFogf, glFogi, glFogfv, glFogiv }

Specify fog parameters

See Also:

[OpenGL Docs](#)

Parameters

- **pname** (*Enumerated constant*) – Specifies a single-valued fog parameter. If the function prototype ends in 'v' specifies a fog parameter.
- **param** (*Depends on function prototype.*) – Specifies the value or values to be assigned to pname. GL_FOG_COLOR requires an array of four values. All other parameters accept an array containing only a single value.

glFrontFace (mode) :

Define front- and back-facing polygons

See Also:

[OpenGL Docs](#)

Parameters **mode** (*Enumerated constant*) – Specifies the orientation of front-facing polygons.

glFrustum(left, right, bottom, top, zNear, zFar):

Multiply the current matrix by a perspective matrix

See Also:

[OpenGL Docs](#)

Parameters

- **right** (*left*,) – Specify the coordinates for the left and right vertical clipping planes.
- **bottom** (*top*,) – Specify the coordinates for the bottom and top horizontal clipping planes.
- **zFar** (*zNear*,) – Specify the distances to the near and far depth clipping planes. Both distances must be positive.

glGenLists(range):

Generate a contiguous set of empty display lists

See Also:

[OpenGL Docs](#)

Parameters **range** (*int*) – Specifies the number of contiguous empty display lists to be generated.

glGenTextures(n, textures):

Generate texture names

See Also:

[OpenGL Docs](#)

Parameters

- **n** (*int*) – Specifies the number of textures name to be generated.
- **textures** (`ogl.Buffer` object I{type `GL_INT`}) – Specifies an array in which the generated textures names are stored.

glGet(pname, param):

B{glGetBooleanv, glGetfloatv, glGetFloatv, glGetIntegerv}

Return the value or values of a selected parameter

See Also:

[OpenGL Docs](#)

Parameters

- **pname** (*Enumerated constant*) – Specifies the parameter value to be returned.
- **param** (*Depends on function prototype.*) – Returns the value or values of the specified parameter.

glGetClipPlane(plane, equation):

Return the coefficients of the specified clipping plane

See Also:

[OpenGL Docs](#)

Parameters

- **plane** (*Enumerated constant*) – Specifies a clipping plane. The number of clipping planes depends on the implementation, but at least six clipping planes are supported. They are identified by symbolic names of the form `GL_CLIP_PLANEi` where $0 < i < GL_MAX_CLIP_PLANES$.
- **equation** (`bg1.Buffer` object I{type `GL_FLOAT`}) – Returns four float (double)-precision values that are the coefficients of the plane equation of plane in eye coordinates. The initial value is (0, 0, 0, 0).

glGetError () :

Return error information

See Also:

[OpenGL Docs](#)

glGetLight (light, pname, params):

B{glGetLightfv and glGetLightiv}

Return light source parameter values

See Also:

[OpenGL Docs](#)

Parameters

- **light** (*Enumerated constant*) – Specifies a light source. The number of possible lights depends on the implementation, but at least eight lights are supported. They are identified by symbolic names of the form `GL_LIGHTi` where $0 < i < GL_MAX_LIGHTS$.
- **pname** (*Enumerated constant*) – Specifies a light source parameter for light.
- **params** (`bg1.Buffer` object. Depends on function prototype.) – Returns the requested data.

glGetMap (target, query, v):

B{glGetMapdv, glGetMapfv, glGetMapiv}

Return evaluator parameters

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies the symbolic name of a map.
- **query** (*Enumerated constant*) – Specifies which parameter to return.
- **v** (`bg1.Buffer` object. Depends on function prototype.) – Returns the requested data.

glGetMaterial (face, pname, params):

B{glGetMaterialfv, glGetMaterialiv}

Return material parameters

See Also:

[OpenGL Docs](#)

Parameters

- **face** (*Enumerated constant*) – Specifies which of the two materials is being queried. representing the front and back materials, respectively.
- **pname** (*Enumerated constant*) – Specifies the material parameter to return.
- **params** (`bgl.Buffer` object. Depends on function prototype.) – Returns the requested data.

glGetPixelMap (map, values) :

B{glGetPixelMapfv, glGetPixelMapuiv, glGetPixelMapusv}

Return the specified pixel map

See Also:[OpenGL Docs](#)**Parameters**

- **map** (*Enumerated constant*) – Specifies the name of the pixel map to return.
- **values** (`bgl.Buffer` object. Depends on function prototype.) – Returns the pixel map contents.

glGetPolygonStipple (mask) :

Return the polygon stipple pattern

See Also:[OpenGL Docs](#)

Parameters mask (`bgl.Buffer` object I{type `GL_BYTE`}) – Returns the stipple pattern. The initial value is all 1's.

glGetString (name) :

Return a string describing the current GL connection

See Also:[OpenGL Docs](#)

Parameters name (*Enumerated constant*) – Specifies a symbolic constant.

glGetTexEnv (target, pname, params) :

B{glGetTexEnvfv, glGetTexEnviv}

Return texture environment parameters

See Also:[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies a texture environment. Must be `GL_TEXTURE_ENV`.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of a texture environment parameter.
- **params** (`bgl.Buffer` object. Depends on function prototype.) – Returns the requested data.

glGetTexGen (coord, pname, params):
B{glGetTexGenfv, glGetTexGeniv}

Return texture coordinate generation parameters

See Also:

[OpenGL Docs](#)

Parameters

- **coord** (*Enumerated constant*) – Specifies a texture coordinate.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of the value(s) to be returned.
- **params** (bgl.Buffer object. Depends on function prototype.) – Returns the requested data.

glGetTexImage(target, level, format, type, pixels):
Return a texture image

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies which texture is to be obtained.
- **level** (*int*) – Specifies the level-of-detail number of the desired image. Level 0 is the base image level. Level n is the nth mipmap reduction image.
- **format** (*Enumerated constant*) – Specifies a pixel format for the returned data.
- **type** (*Enumerated constant*) – Specifies a pixel type for the returned data.
- **pixels** (bgl.Buffer object.) – Returns the texture image. Should be a pointer to an array of the type specified by type

glGetTexParameter(target, level, pname, params):
B{glGetTexParameterfv, glGetTexParameteriv}

return texture parameter values for a specific level of detail

See Also:

U{opengl.org/developers/documentation/man_pages/hardcopy/GL/html/gl/gettexlevelparameter.html}>_

Parameters

- **target** (*Enumerated constant*) – Specifies the symbolic name of the target texture.
- **level** (*int*) – Specifies the level-of-detail number of the desired image. Level 0 is the base image level. Level n is the nth mipmap reduction image.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of a texture parameter.
- **params** (bgl.Buffer object. Depends on function prototype.) – Returns the requested data.

glGetTexParameter(target, pname, params):
B{glGetTexParameterfv, glGetTexParameteriv}

Return texture parameter values

See Also:

[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies the symbolic name of the target texture.
- **pname** (*Enumerated constant*) – Specifies the symbolic name the target texture.
- **params** (`bgl.Buffer` object. Depends on function prototype.) – Returns the texture parameters.

glHint(target, mode) :

Specify implementation-specific hints

See Also:[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies a symbolic constant indicating the behavior to be controlled.
- **mode** (*Enumerated constant*) – Specifies a symbolic constant indicating the desired behavior.

glIndex(c) :

`B{glIndexd, glIndexf, glIndexi, glIndexs, glIndexdv, glIndexfv, glIndexiv, glIndexsv}`

Set the current color index

See Also:[OpenGL Docs](#)

Parameters `c` (`bgl.Buffer` object. Depends on function prototype.) – Specifies a pointer to a one element array that contains the new value for the current color index.

glInitNames() :

Initialize the name stack

See Also:[OpenGL Docs](#)**glIsEnabled(cap) :**

Test whether a capability is enabled

See Also:[OpenGL Docs](#)

Parameters `cap` (*Enumerated constant*) – Specifies a constant representing a GL capability.

glIsList(list) :

Determine if a name corresponds to a display-list

See Also:[OpenGL Docs](#)

Parameters `list` (*unsigned int*) – Specifies a potential display-list name.

glIsTexture (texture) :

Determine if a name corresponds to a texture

See Also:

[OpenGL Docs](#)

Parameters *texture* (*unsigned int*) – Specifies a value that may be the name of a texture.

glLight (light, pname, param) :

B{glLightf,glLighti, glLightfv, glLightiv}

Set the light source parameters

See Also:

[OpenGL Docs](#)

Parameters

- **light** (*Enumerated constant*) – Specifies a light. The number of lights depends on the implementation, but at least eight lights are supported. They are identified by symbolic names of the form `GL_LIGHTi` where $0 < i < \text{GL_MAX_LIGHTS}$.
- **pname** (*Enumerated constant*) – Specifies a single-valued light source parameter for light.
- **param** (*Depends on function prototype.*) – Specifies the value that parameter `pname` of light source light will be set to. If function prototype ends in ‘v’ specifies a pointer to the value or values that parameter `pname` of light source light will be set to.

glLightModel (pname, param) :

B{glLightModelf, glLightModeli, glLightModelfv, glLightModeliv}

Set the lighting model parameters

See Also:

[OpenGL Docs](#)

Parameters

- **pname** (*Enumerated constant*) – Specifies a single-value light model parameter.
- **param** (*Depends on function prototype.*) – Specifies the value that `param` will be set to. If function prototype ends in ‘v’ specifies a pointer to the value or values that `param` will be set to.

glLineStipple (factor, pattern) :

Specify the line stipple pattern

See Also:

[OpenGL Docs](#)

Parameters

- **factor** (*int*) – Specifies a multiplier for each bit in the line stipple pattern. If `factor` is 3, for example, each bit in the pattern is used three times before the next bit in the pattern is used. `factor` is clamped to the range `[1, 256]` and defaults to 1.
- **pattern** (*unsigned short int*) – Specifies a 16-bit integer whose bit pattern determines which fragments of a line will be drawn when the line is rasterized. Bit zero is used first; the default pattern is all 1’s.

glLineWidth (width) :

Specify the width of rasterized lines.

See Also:

[OpenGL Docs](#)

Parameters *width* (*float*) – Specifies the width of rasterized lines. The initial value is 1.

glListBase (base) :

Set the display-list base for glCallLists

See Also:

[OpenGL Docs](#)

Parameters *base* (*unsigned int*) – Specifies an integer offset that will be added to glCallLists offsets to generate display-list names. The initial value is 0.

glLoadIdentity () :

Replace the current matrix with the identity matrix

See Also:

[OpenGL Docs](#)

glLoadMatrix (m) :

B{glLoadMatrixd, glLoadMatixf}

Replace the current matrix with the specified matrix

See Also:

[OpenGL Docs](#)

Parameters *m* (*bg1.Buffer* object. Depends on function prototype.) – Specifies a pointer to 16 consecutive values, which are used as the elements of a 4x4 column-major matrix.

glLoadName (name) :

Load a name onto the name stack.

See Also:

[OpenGL Docs](#)

Parameters *name* (*unsigned int*) – Specifies a name that will replace the top value on the name stack.

glLogicOp (opcode) :

Specify a logical pixel operation for color index rendering

See Also:

[OpenGL Docs](#)

Parameters *opcode* (*Enumerated constant*) – Specifies a symbolic constant that selects a logical operation.

glMap1 (target, u1, u2, stride, order, points) :

B{glMap1d, glMap1f}

Define a one-dimensional evaluator

See Also:

[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies the kind of values that are generated by the evaluator.
- **u1,u2** – Specify a linear mapping of u, as presented to `glEvalCoord1`, to \wedge , the variable that is evaluated by the equations specified by this command.
- **stride** (*int*) – Specifies the number of floats or float (double)s between the beginning of one control point and the beginning of the next one in the data structure referenced in points. This allows control points to be embedded in arbitrary data structures. The only constraint is that the values for a particular control point must occupy contiguous memory locations.
- **order** (*int*) – Specifies the number of control points. Must be positive.
- **points** (`bg1.Buffer` object. Depends on function prototype.) – Specifies a pointer to the array of control points.

glMap2 (**target**, **u1**, **u2**, **ustride**, **uorder**, **v1**, **v2**, **vstride**, **vorder**, **points**):
B{glMap2d, glMap2f}

Define a two-dimensional evaluator

See Also:

[OpenGL Docs](#)**Parameters**

- **target** (*Enumerated constant*) – Specifies the kind of values that are generated by the evaluator.
- **u1,u2** – Specify a linear mapping of u, as presented to `glEvalCoord2`, to \wedge , the variable that is evaluated by the equations specified by this command. Initially u1 is 0 and u2 is 1.
- **ustride** (*int*) – Specifies the number of floats or float (double)s between the beginning of control point R and the beginning of control point R ij, where i and j are the u and v control point indices, respectively. This allows control points to be embedded in arbitrary data structures. The only constraint is that the values for a particular control point must occupy contiguous memory locations. The initial value of ustride is 0.
- **uorder** (*int*) – Specifies the dimension of the control point array in the u axis. Must be positive. The initial value is 1.
- **v2** (*v1*,) – Specify a linear mapping of v, as presented to `glEvalCoord2`, to \wedge , one of the two variables that are evaluated by the equations specified by this command. Initially, v1 is 0 and v2 is 1.
- **vstride** (*int*) – Specifies the number of floats or float (double)s between the beginning of control point R and the beginning of control point R ij, where i and j are the u and v control point(indices, respectively). This allows control points to be embedded in arbitrary data structures. The only constraint is that the values for a particular control point must occupy contiguous memory locations. The initial value of vstride is 0.
- **vorder** (*int*) – Specifies the dimension of the control point array in the v axis. Must be positive. The initial value is 1.
- **points** (`bg1.Buffer` object. Depends on function prototype.) – Specifies a pointer to the array of control points.

glMapGrid (un, u1, u2, vn, v1, v2) :

B{glMapGrid1d, glMapGrid1f, glMapGrid2d, glMapGrid2f}

Define a one- or two-dimensional mesh

See Also:[OpenGL Docs](#)**Parameters**

- **un** (*int*) – Specifies the number of partitions in the grid range interval [u1, u2]. Must be positive.
- **u2** (*u1,*) – Specify the mappings for integer grid domain values i=0 and i=un.
- **vn** (*int*) – Specifies the number of partitions in the grid range interval [v1, v2] (glMapGrid2 only).
- **v2** (*v1,*) – Specify the mappings for integer grid domain values j=0 and j=vn (glMapGrid2 only).

glMaterial (face, pname, params) :

Specify material parameters for the lighting model.

See Also:[OpenGL Docs](#)**Parameters**

- **face** (*Enumerated constant*) – Specifies which face or faces are being updated. Must be one of:
- **pname** (*Enumerated constant*) – Specifies the single-valued material parameter of the face or faces that is being updated. Must be GL_SHININESS.
- **params** (*int*) – Specifies the value that parameter GL_SHININESS will be set to. If function prototype ends in 'v' specifies a pointer to the value or values that pname will be set to.

glMatrixMode (mode) :

Specify which matrix is the current matrix.

See Also:[OpenGL Docs](#)

Parameters mode (*Enumerated constant*) – Specifies which matrix stack is the target for subsequent matrix operations.

glMultMatrix (m) :

B{glMultMatrixd, glMultMatrixf}

Multiply the current matrix with the specified matrix

See Also:[OpenGL Docs](#)

Parameters m (*ogl.Buffer object. Depends on function prototype.*) – Points to 16 consecutive values that are used as the elements of a 4x4 column major matrix.

glNewList (list, mode) :

Create or replace a display list

See Also:

[OpenGL Docs](#)

Parameters

- **list** (*unsigned int*) – Specifies the display list name
- **mode** (*Enumerated constant*) – Specifies the compilation mode.

glNormal3 (nx, ny, nz, v) :

B{Normal3b, Normal3bv, Normal3d, Normal3dv, Normal3f, Normal3fv, Normal3i, Normal3iv, Normal3s, Normal3sv}

Set the current normal vector

See Also:

[OpenGL Docs](#)

Parameters

- **ny, nz** (*nx*) – Specify the x, y, and z coordinates of the new current normal. The initial value of the current normal is the unit vector, (0, 0, 1).
- **v** (*ogl.Buffer* object. Depends on function prototype. ('v' prototypes)) – Specifies a pointer to an array of three elements: the x, y, and z coordinates of the new current normal.

glOrtho(left, right, bottom, top, zNear, zFar) :

Multiply the current matrix with an orthographic matrix

See Also:

[OpenGL Docs](#)

Parameters

- **right** (*left*,) – Specify the coordinates for the left and right vertical clipping planes.
- **top** (*bottom*,) – Specify the coordinates for the bottom and top horizontal clipping planes.
- **zFar** (*zNear*,) – Specify the distances to the nearer and farther depth clipping planes. These values are negative if the plane is to be behind the viewer.

glPassThrough (token) :

Place a marker in the feedback buffer

See Also:

[OpenGL Docs](#)

Parameters token (*float*) – Specifies a marker value to be placed in the feedback buffer following a GL_PASS_THROUGH_TOKEN.

glPixelMap (map, mapsize, values) :

B{glPixelMapfv, glPixelMapuiv, glPixelMapusv}

Set up pixel transfer maps

See Also:

[OpenGL Docs](#)

Parameters

- **map** (*Enumerated constant*) – Specifies a symbolic map name.
- **mapsize** (*int*) – Specifies the size of the map being defined.
- **values** (`bg1.Buffer` object. Depends on function prototype.) – Specifies an array of `mapsize` values.

glPixelStore (pname, param) :

B{glPixelStoref, glPixelStorei}

Set pixel storage modes

See Also:[OpenGL Docs](#)**Parameters**

- **pname** (*Enumerated constant*) – Specifies the symbolic name of the parameter to be set. Six values affect the packing of pixel data into memory. Six more affect the unpacking of pixel data from memory.
- **param** (*Depends on function prototype.*) – Specifies the value that `pname` is set to.

glPixelTransfer (pname, param) :

B{glPixelTransferf, glPixelTransferi}

Set pixel transfer modes

See Also:[OpenGL Docs](#)**Parameters**

- **pname** (*Enumerated constant*) – Specifies the symbolic name of the pixel transfer parameter to be set.
- **param** (*Depends on function prototype.*) – Specifies the value that `pname` is set to.

glPixelZoom(xfactor, yfactor) :

Specify the pixel zoom factors

See Also:[OpenGL Docs](#)**Parameters** `yfactor` (*xfactor*;) – Specify the x and y zoom factors for pixel write operations.**glPointSize (size) :**

Specify the diameter of rasterized points

See Also:[OpenGL Docs](#)**Parameters** `size` (*float*) – Specifies the diameter of rasterized points. The initial value is 1.**glPolygonMode (face, mode) :**

Select a polygon rasterization mode

See Also:[OpenGL Docs](#)

Parameters

- **face** (*Enumerated constant*) – Specifies the polygons that mode applies to. Must be GL_FRONT for front-facing polygons, GL_BACK for back-facing polygons, or GL_FRONT_AND_BACK for front- and back-facing polygons.
- **mode** (*Enumerated constant*) – Specifies how polygons will be rasterized. The initial value is GL_FILL for both front- and back-facing polygons.

glPolygonOffset (factor, units) :

Set the scale and units used to calculate depth values

See Also:

[OpenGL Docs](#)

Parameters

- **factor** (*float*) – Specifies a scale factor that is used to create a variable depth offset for each polygon. The initial value is 0.
- **units** (*float*) – Is multiplied by an implementation-specific value to create a constant depth offset. The initial value is 0.

glPolygonStipple (mask) :

Set the polygon stippling pattern

See Also:

[OpenGL Docs](#)

Parameters **mask** (`ogl.Buffer` object I{type GL_BYTE}) – Specifies a pointer to a 32x32 stipple pattern that will be unpacked from memory in the same way that `glDrawPixels` unpacks pixels.

glPopAttrib () :

Pop the server attribute stack

See Also:

[OpenGL Docs](#)

glPopClientAttrib () :

Pop the client attribute stack

See Also:

[OpenGL Docs](#)

glPopMatrix () :

Pop the current matrix stack

See Also:

[OpenGL Docs](#)

glPopName () :

Pop the name stack

See Also:

[OpenGL Docs](#)

glPrioritizeTextures(n, textures, priorities):

Set texture residence priority

See Also:

[OpenGL Docs](#)

Parameters

- **n** (*int*) – Specifies the number of textures to be prioritized.
- **textures** (`bg1.Buffer I{type GL_INT}`) – Specifies an array containing the names of the textures to be prioritized.
- **priorities** (`bg1.Buffer I{type GL_FLOAT}`) – Specifies an array containing the texture priorities. A priority given in an element of priorities applies to the texture named by the corresponding element of textures.

glPushAttrib(mask):

Push the server attribute stack

See Also:

[OpenGL Docs](#)

Parameters mask (*Enumerated constant(s)*) – Specifies a mask that indicates which attributes to save.

glPushClientAttrib(mask):

Push the client attribute stack

See Also:

[OpenGL Docs](#)

Parameters mask (*Enumerated constant(s)*) – Specifies a mask that indicates which attributes to save.

glPushMatrix():

Push the current matrix stack

See Also:

[OpenGL Docs](#)

glPushName(name):

Push the name stack

See Also:

[OpenGL Docs](#)

Parameters name (*unsigned int*) – Specifies a name that will be pushed onto the name stack.

glRasterPos(x, y, z, w):

`B{glRasterPos2d, glRasterPos2f, glRasterPos2i, glRasterPos2s, glRasterPos3d, glRasterPos3f, glRasterPos3i, glRasterPos3s, glRasterPos4d, glRasterPos4f, glRasterPos4i, glRasterPos4s, glRasterPos2dv, glRasterPos2fv, glRasterPos2iv, glRasterPos2sv, glRasterPos3dv, glRasterPos3fv, glRasterPos3iv, glRasterPos3sv, glRasterPos4dv, glRasterPos4fv, glRasterPos4iv, glRasterPos4sv}`

Specify the raster position for pixel operations

See Also:

[OpenGL Docs](#)

Parameters **y, z, w** (*x*) – Specify the *x,y,z*, and *w* object coordinates (if present) for the raster position. If function prototype ends in ‘v’ specifies a pointer to an array of two, three, or four elements, specifying *x, y, z*, and *w* coordinates, respectively.

Note: If you are drawing to the 3d view with a Scriptlink of a space handler the zoom level of the panels will scale the `glRasterPos` by the view matrix. so a X of 10 will not always offset 10 pixels as you would expect.

To work around this get the scale value of the view matrix and use it to scale your pixel values.

```
import bgl
xval, yval= 100, 40
# Get the scale of the view matrix
view_matrix = bgl.Buffer(bgl.GL_FLOAT, 16)
bgl.glGetFloatv(bgl.GL_MODELVIEW_MATRIX, view_matrix)
f = 1.0 / view_matrix[0]

# Instead of the usual glRasterPos2i(xval, yval)
bgl.glRasterPos2f(xval * f, yval * f)
```

glReadBuffer(mode) :

Select a color buffer source for pixels.

See Also:[OpenGL Docs](#)

Parameters **mode** (*Enumerated constant*) – Specifies a color buffer.

glReadPixels(x, y, width, height, format, type, pixels):

Read a block of pixels from the frame buffer

See Also:[OpenGL Docs](#)**Parameters**

- **y** (*x*) – Specify the window coordinates of the first pixel that is read from the frame buffer. This location is the lower left corner of a rectangular block of pixels.
- **height** (*width*,) – Specify the dimensions of the pixel rectangle. *width* and *height* of one correspond to a single pixel.
- **format** (*Enumerated constant*) – Specifies the format of the pixel data.
- **type** (*Enumerated constant*) – Specifies the data type of the pixel data.
- **pixels** (`bgl.Buffer` object) – Returns the pixel data.

glRect (x1, y1, x2, y2, v1, v2) :

B{glRectd, glRectf, glRecti, glRects, glRectdv, glRectfv, glRectiv, glRectsv}

Draw a rectangle

See Also:[OpenGL Docs](#)**Parameters**

- **y1** (*x1*,) – Specify one vertex of a rectangle
- **y2** (*x2*,) – Specify the opposite vertex of the rectangle
- **v2** (*v1*,) – Specifies a pointer to one vertex of a rectangle and the pointer to the opposite vertex of the rectangle

glRenderMode (mode) :

Set rasterization mode

See Also:

[OpenGL Docs](#)

Parameters **mode** (*Enumerated constant*) – Specifies the rasterization mode.

glRotate (angle, x, y, z) :

B{glRotated, glRotatef}

Multiply the current matrix by a rotation matrix

See Also:

[OpenGL Docs](#)

Parameters

- **angle** (*Depends on function prototype.*) – Specifies the angle of rotation in degrees.
- **y, z** (*x*,) – Specify the x, y, and z coordinates of a vector respectively.

glScale (x, y, z) :

B{glScaled, glScalef}

Multiply the current matrix by a general scaling matrix

See Also:

[OpenGL Docs](#)

Parameters **y, z** (*x*,) – Specify scale factors along the x, y, and z axes, respectively.

glScissor (x, y, width, height) :

Define the scissor box

See Also:

[OpenGL Docs](#)

Parameters

- **y** (*x*,) – Specify the lower left corner of the scissor box. Initially (0, 0).
- **height** (*width*) – Specify the width and height of the scissor box. When a GL context is first attached to a window, width and height are set to the dimensions of that window.

glSelectBuffer (size, buffer) :

Establish a buffer for selection mode values

See Also:

[OpenGL Docs](#)

Parameters

- **size** (*int*) – Specifies the size of buffer

- **buffer** (`ogl.Buffer I{type GL_INT}`) – Returns the selection data

glShadeModel (mode) :

Select flat or smooth shading

See Also:

[OpenGL Docs](#)

Parameters mode (*Enumerated constant*) – Specifies a symbolic value representing a shading technique.

glStencilFunc(func, ref, mask) :

Set function and reference value for stencil testing

See Also:

[OpenGL Docs](#)

Parameters

- **func** (*Enumerated constant*) – Specifies the test function.
- **ref** (*int*) – Specifies the reference value for the stencil test. `ref` is clamped to the range $[0, 2^n - 1]$, where n is the number of bitplanes in the stencil buffer. The initial value is 0.
- **mask** (*unsigned int*) – Specifies a mask that is ANDed with both the reference value and the stored stencil value when the test is done. The initial value is all 1's.

glStencilMask(mask) :

Control the writing of individual bits in the stencil planes

See Also:

[OpenGL Docs](#)

Parameters mask (*unsigned int*) – Specifies a bit mask to enable and disable writing of individual bits in the stencil planes. Initially, the mask is all 1's.

glStencilOp(fail, zfail, zpass) :

Set stencil test actions

See Also:

[OpenGL Docs](#)

Parameters

- **fail** (*Enumerated constant*) – Specifies the action to take when the stencil test fails. The initial value is `GL_KEEP`.
- **zfail** (*Enumerated constant*) – Specifies the stencil action when the stencil test passes, but the depth test fails. `zfail` accepts the same symbolic constants as `fail`. The initial value is `GL_KEEP`.
- **zpass** (*Enumerated constant*) – Specifies the stencil action when both the stencil test and the depth test pass, or when the stencil test passes and either there is no depth buffer or depth testing is not enabled. `zpass` accepts the same symbolic constants as `fail`. The initial value is `GL_KEEP`.

glTexCoord (s, t, r, q, v) :

`B{glTexCoord1d, glTexCoord1f, glTexCoord1i, glTexCoord1s, glTexCoord2d, glTexCoord2f, glTexCoord2i,`

glTexCoord2s, glTexCoord3d, glTexCoord3f, glTexCoord3i, glTexCoord3s, glTexCoord4d, glTexCoord4f, glTexCoord4i, glTexCoord4s, glTexCoord1dv, glTexCoord1fv, glTexCoord1iv, glTexCoord1sv, glTexCoord2dv, glTexCoord2fv, glTexCoord2iv, glTexCoord2sv, glTexCoord3dv, glTexCoord3fv, glTexCoord3iv, glTexCoord3sv, glTexCoord4dv, glTexCoord4fv, glTexCoord4iv, glTexCoord4sv}

Set the current texture coordinates

See Also:

[OpenGL Docs](#)

Parameters

- **t, r, q** (*s*) – Specify s, t, r, and q texture coordinates. Not all parameters are present in all forms of the command.
- **v** (`ogl.Buffer` object. Depends on function prototype. (for ‘v’ prototypes only)) – Specifies a pointer to an array of one, two, three, or four elements, which in turn specify the s, t, r, and q texture coordinates.

glTexEnv (target, pname, param):

B{glTexEnvf, glTexEnvi, glTexEnvfv, glTexEnviv}

Set texture environment parameters

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies a texture environment. Must be `GL_TEXTURE_ENV`.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of a single-valued texture environment parameter. Must be `GL_TEXTURE_ENV_MODE`.
- **param** (*Depends on function prototype.*) – Specifies a single symbolic constant. If function prototype ends in ‘v’ specifies a pointer to a parameter array that contains either a single symbolic constant or an RGBA color

glTexGen (coord, pname, param):

B{glTexGend, glTexGenf, glTexGeni, glTexGendv, glTexGenfv, glTexGeniv}

Control the generation of texture coordinates

See Also:

[OpenGL Docs](#)

Parameters

- **coord** (*Enumerated constant*) – Specifies a texture coordinate.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of the texture-coordinate generation function.
- **param** (*Depends on function prototype.*) – Specifies a single-valued texture generation parameter. If function prototype ends in ‘v’ specifies a pointer to an array of texture generation parameters. If pname is `GL_TEXTURE_GEN_MODE`, then the array must contain a single symbolic constant. Otherwise, param holds the coefficients for the texture-coordinate generation function specified by pname.

glTexImage1D(target, level, internalformat, width, border, format, type, pixels):
Specify a one-dimensional texture image

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies the target texture.
- **level** (*int*) – Specifies the level-of-detail number. Level 0 is the base image level. Level n is the nth mipmap reduction image.
- **internalformat** (*int*) – Specifies the number of color components in the texture.
- **width** (*int*) – Specifies the width of the texture image. Must be $2n+2(\text{border})$ for some integer n. All implementations support texture images that are at least 64 texels wide. The height of the 1D texture image is 1.
- **border** (*int*) – Specifies the width of the border. Must be either 0 or 1.
- **format** (*Enumerated constant*) – Specifies the format of the pixel data.
- **type** (*Enumerated constant*) – Specifies the data type of the pixel data.
- **pixels** (`ogl.Buffer` object.) – Specifies a pointer to the image data in memory.

glTexImage2D(target, level, internalformat, width, height, border, format, type, pixels):
Specify a two-dimensional texture image

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies the target texture.
- **level** (*int*) – Specifies the level-of-detail number. Level 0 is the base image level. Level n is the nth mipmap reduction image.
- **internalformat** (*int*) – Specifies the number of color components in the texture.
- **width** (*int*) – Specifies the width of the texture image. Must be $2n+2(\text{border})$ for some integer n. All implementations support texture images that are at least 64 texels wide.
- **height** (*int*) – Specifies the height of the texture image. Must be $2m+2(\text{border})$ for some integer m. All implementations support texture images that are at least 64 texels high.
- **border** (*int*) – Specifies the width of the border. Must be either 0 or 1.
- **format** (*Enumerated constant*) – Specifies the format of the pixel data.
- **type** (*Enumerated constant*) – Specifies the data type of the pixel data.
- **pixels** (`ogl.Buffer` object.) – Specifies a pointer to the image data in memory.

glTexParameter(target, pname, param):

`B{glTexParameterf, glTexParameterI, glTexParameterfv, glTexParameteriv}`

Set texture parameters

See Also:

[OpenGL Docs](#)

Parameters

- **target** (*Enumerated constant*) – Specifies the target texture.
- **pname** (*Enumerated constant*) – Specifies the symbolic name of a single-valued texture parameter.
- **param** (*Depends on function prototype.*) – Specifies the value of pname. If function prototype ends in ‘v’ specifies a pointer to an array where the value or values of pname are stored.

glTranslate (x, y, z) :

B{glTranslatef, glTranslated}

Multiply the current matrix by a translation matrix

See Also:[OpenGL Docs](#)**Parameters** **y, z** (*x*,) – Specify the x, y, and z coordinates of a translation vector.**glVertex (x, y, z, w, v) :**

B{glVertex2d, glVertex2f, glVertex2i, glVertex2s, glVertex3d, glVertex3f, glVertex3i, glVertex3s, glVertex4d, glVertex4f, glVertex4i, glVertex4s, glVertex2dv, glVertex2fv, glVertex2iv, glVertex2sv, glVertex3dv, glVertex3fv, glVertex3iv, glVertex3sv, glVertex4dv, glVertex4fv, glVertex4iv, glVertex4sv}

Specify a vertex

See Also:[OpenGL Docs](#)**Parameters**

- **y, z, w** (*x*,) – Specify x, y, z, and w coordinates of a vertex. Not all parameters are present in all forms of the command.
- **v** (*bgl.Buffer* object. Depends of function prototype (for ‘v’ prototypes only)) – Specifies a pointer to an array of two, three, or four elements. The elements of a two-element array are x and y; of a three-element array, x, y, and z; and of a four-element array, x, y, z, and w.

glViewport (x, y, width, height) :

Set the viewport

See Also:[OpenGL Docs](#)**Parameters**

- **y** (*x*,) – Specify the lower left corner of the viewport rectangle, in pixels. The initial value is (0,0).
- **height** (*width*,) – Specify the width and height of the viewport. When a GL context is first attached to a window, width and height are set to the dimensions of that window.

gluPerspective (fovY, aspect, zNear, zFar) :

Set up a perspective projection matrix.

See Also:U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **fovY** (*double*) – Specifies the field of view angle, in degrees, in the y direction.
- **aspect** (*double*) – Specifies the aspect ratio that determines the field of view in the x direction. The aspect ratio is the ratio of x (width) to y (height).
- **zNear** (*double*) – Specifies the distance from the viewer to the near clipping plane (always positive).
- **zFar** (*double*) – Specifies the distance from the viewer to the far clipping plane (always positive).

gluLookAt(eyex, eyey, eyez, centerx, centery, centerz, upx, upy, upz):

Define a viewing transformation.

See Also:

U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **eyex, eyez** (*eyex,*) – Specifies the position of the eye point.
- **centery, centerz** (*centerx,*) – Specifies the position of the reference point.
- **upy, upz** (*upx,*) – Specifies the direction of the up vector.

gluOrtho2D(left, right, bottom, top):

Define a 2-D orthographic projection matrix.

See Also:

U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **right** (*left,*) – Specify the coordinates for the left and right vertical clipping planes.
- **top** (*bottom,*) – Specify the coordinates for the bottom and top horizontal clipping planes.

gluPickMatrix(x, y, width, height, viewport):

Define a picking region.

See Also:

U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **y** (*x,*) – Specify the center of a picking region in window coordinates.
- **height** (*width,*) – Specify the width and height, respectively, of the picking region in window coordinates.
- **viewport** (`bgl.Buffer object. [int]`) – Specifies the current viewport.

gluProject(objx, objy, objz, modelMatrix, projMatrix, viewport, winx, winy, winz):

Map object coordinates to window coordinates.

See Also:

U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **objy, objz** (*objx*,) – Specify the object coordinates.
- **modelMatrix** (`bgl.Buffer` object. [double]) – Specifies the current modelview matrix (as from a `glGetDoublev` call).
- **projMatrix** (`bgl.Buffer` object. [double]) – Specifies the current projection matrix (as from a `glGetDoublev` call).
- **viewport** (`bgl.Buffer` object. [int]) – Specifies the current viewport (as from a `glGetIntegerv` call).
- **winy, winz** (*winx*,) – Return the computed window coordinates.

gluUnProject(winx, winy, winz, modelMatrix, projMatrix, viewport, objx, objy, objz):
Map object coordinates to window coordinates.

See Also:

U{http://biology.ncsa.uiuc.edu/cgi-bin/infosrch.cgi?cmd=getdoc&coll=0650&db=bks&fname=/SGI_Developer/OpenGL_RM/ch}

Parameters

- **winy, winz** (*winx*,) – Specify the window coordinates to be mapped.
- **modelMatrix** (`bgl.Buffer` object. [double]) – Specifies the current modelview matrix (as from a `glGetDoublev` call).
- **projMatrix** (`bgl.Buffer` object. [double]) – Specifies the current projection matrix (as from a `glGetDoublev` call).
- **viewport** (`bgl.Buffer` object. [int]) – Specifies the current viewport (as from a `glGetIntegerv` call).
- **objy, objz** (*objx*,) – Return the computed object coordinates.

class Buffer:

The Buffer object is simply a block of memory that is delineated and initialized by the user. Many OpenGL functions return data to a C-style pointer, however, because this is not possible in python the Buffer object can be used to this end. Wherever pointer notation is used in the OpenGL functions the Buffer object can be used in it's `bgl` wrapper. In some instances the Buffer object will need to be initialized with the template parameter, while in other instances the user will want to create just a blank buffer which will be zeroed by default.

```
import bgl
```

```
myByteBuffer = bgl.Buffer(bgl.GL_BYTE, [32, 32])
bgl.glGetPolygonStipple(myByteBuffer)
```

```
print(myByteBuffer.dimensions)
print(myByteBuffer.to_list())
```

```
sliceBuffer = myByteBuffer[0:16]
print(sliceBuffer)
```

bgl.dimensions

The number of dimensions of the Buffer.

bgl.to_list()

The contents of the Buffer as a python list.

`__init__(type, dimensions, template = None):`

This will create a new Buffer object for use with other bgl OpenGL commands. Only the type of argument to store in the buffer and the dimensions of the buffer are necessary. Buffers are zeroed by default unless a template is supplied, in which case the buffer is initialized to the template.

Parameters

- **type** (*int*) – The format to store data in. The type should be one of GL_BYTE, GL_SHORT, GL_INT, or GL_FLOAT.
- **dimensions** (*An int or sequence object specifying the dimensions of the buffer.*) – If the dimensions are specified as an int a linear array will be created for the buffer. If a sequence is passed for the dimensions, the buffer becomes n-Dimensional, where n is equal to the number of parameters passed in the sequence. Example: [256,2] is a two- dimensional buffer while [256,256,4] creates a three- dimensional buffer. You can think of each additional dimension as a sub-item of the dimension to the left. i.e. [10,2] is a 10 element array each with 2 sub-items. [(0,0), (0,1), (1,0), (1,1), (2,0), ...] etc.
- **template** (*A python sequence object (optional)*) – A sequence of matching dimensions which will be used to initialize the Buffer. If a template is not passed in all fields will be initialized to 0.

Return type Buffer object

Returns The newly created buffer as a PyObject.

3.4 Font Drawing (blf)

This module provides access to blenders text drawing functions.

3.4.1 Hello World Text Example

Blender Game Engine example of using the blf module. For this module to work we need to use the OpenGL wrapper bgl as well.

```
# import game engine modules
from bge import render
from bge import logic
# import stand alone modules
import bgl
import blf

def init():
    """init function - runs once"""
    # create a new font object, use external ttf file
    font_path = logic.expandPath('//Zeyada.ttf')
    # store the font indice - to use later
    logic.font_id = blf.load(font_path)

    # set the font drawing routine to run every frame
    scene = logic.getCurrentScene()
    scene.post_draw = [write]
```

```
def write():
    """write on screen"""
    width = render.getWindowWidth()
    height = render.getWindowHeight()

    # OpenGL setup
    bgl.glMatrixMode(bgl.GL_PROJECTION)
    bgl.glLoadIdentity()
    bgl.gluOrtho2D(0, width, 0, height)
    bgl.glMatrixMode(bgl.GL_MODELVIEW)
    bgl.glLoadIdentity()

    # BLF drawing routine
    font_id = logic.font_id
    blf.position(font_id, (width * 0.2), (height * 0.3), 0)
    blf.size(font_id, 50, 72)
    blf.draw(font_id, "Hello World")
```

blf.aspect (*fontid, aspect*)
Set the aspect for drawing text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **aspect** (*float*) – The aspect ratio for text drawing to use.

blf.blur (*fontid, radius*)
Set the blur radius for drawing text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **radius** (*int*) – The radius for blurring text (in pixels).

blf.clipping (*fontid, xmin, ymin, xmax, ymax*)
Set the clipping, enable/disable using CLIPPING.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **xmin** (*float*) – Clip the drawing area by these bounds.
- **ymin** (*float*) – Clip the drawing area by these bounds.
- **xmax** (*float*) – Clip the drawing area by these bounds.
- **ymax** (*float*) – Clip the drawing area by these bounds.

blf.dimensions (*fontid, text*)
Return the width and height of the text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **text** (*string*) – the text to draw.

Returns the width and height of the text.

Return type tuple of 2 floats

blf.disable (*fontid, option*)
Disable option.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **option** (*int*) – One of ROTATION, CLIPPING, SHADOW or KERNING_DEFAULT.

`blf.draw` (*fontid, text*)

Draw text in the current context.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **text** (*string*) – the text to draw.

`blf.enable` (*fontid, option*)

Enable option.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **option** (*int*) – One of ROTATION, CLIPPING, SHADOW or KERNING_DEFAULT.

`blf.load` (*filename*)

Load a new font.

Parameters **filename** (*string*) – the filename of the font.

Returns the new font's fontid or -1 if there was an error.

Return type integer

`blf.position` (*fontid, x, y, z*)

Set the position for drawing text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **x** (*float*) – X axis position to draw the text.
- **y** (*float*) – Y axis position to draw the text.
- **z** (*float*) – Z axis position to draw the text.

`blf.rotation` (*fontid, angle*)

Set the text rotation angle, enable/disable using ROTATION.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **angle** (*float*) – The angle for text drawing to use.

`blf.shadow` (*fontid, level, r, g, b, a*)

Shadow options, enable/disable using SHADOW .

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **level** (*int*) – The blur level, can be 3, 5 or 0.
- **r** (*float*) – Shadow color (red channel 0.0 - 1.0).
- **g** (*float*) – Shadow color (green channel 0.0 - 1.0).
- **b** (*float*) – Shadow color (blue channel 0.0 - 1.0).

- **a** (*float*) – Shadow color (alpha channel 0.0 - 1.0).

`blf.shadow_offset` (*fontid, x, y*)

Set the offset for shadow text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **x** (*float*) – Vertical shadow offset value in pixels.
- **y** (*float*) – Horizontal shadow offset value in pixels.

`blf.size` (*fontid, size, dpi*)

Set the size and dpi for drawing text.

Parameters

- **fontid** (*int*) – The id of the typeface as returned by `blf.load()`, for default font use 0.
- **size** (*int*) – Point size of the font.
- **dpi** (*int*) – dots per inch value to use for drawing.

`blf.unload` (*filename*)

Unload an existing font.

Parameters **filename** (*string*) – the filename of the font.

constant value 2

constant value 8

constant value 1

constant value 4

3.5 GPU functions (gpu)

This module provides access to materials GLSL shaders.

3.5.1 Intro

Module to provide functions concerning the GPU implementation in Blender, in particular the GLSL shaders that blender generates automatically to render materials in the 3D view and in the game engine.

Warning: The API provided by this module should be consider unstable. The data exposed by the API are are closely related to Blender's internal GLSL code and may change if the GLSL code is modified (e.g. new uniform type).

3.5.2 Constants

GLSL data type

Type of GLSL data. For shader uniforms, the data type determines which `glUniform` function variant to use to send the uniform value to the GPU. For vertex attributes, the data type determines which `glVertexAttrib` function variant to use to send the vertex attribute to the GPU.

See [export_shader](#)

gpu.**GPU_DATA_1I**
one integer

Value 1

gpu.**GPU_DATA_1F**
one float

Value 2

gpu.**GPU_DATA_2F**
two floats

Value 3

gpu.**GPU_DATA_3F**
three floats

Value 4

gpu.**GPU_DATA_4F**
four floats

Value 5

gpu.**GPU_DATA_9F**
matrix 3x3 in column-major order

Value 6

gpu.**GPU_DATA_16F**
matrix 4x4 in column-major order

Value 7

gpu.**GPU_DATA_4UB**
four unsigned byte

Value 8

GLSL uniform type

Constants that specify the type of uniform used in a GLSL shader. The uniform type determines the data type, origin and method of calculation used by Blender to compute the uniform value.

The calculation of some of the uniforms is based on matrices available in the scene:

mat4_cam_to_world Model matrix of the camera. OpenGL 4x4 matrix that converts camera local coordinates to world coordinates. In blender this is obtained from the 'matrix_world' attribute of the camera object.

Some uniform will need the *mat4_world_to_cam* matrix computed as the inverse of this matrix.

mat4_object_to_world Model matrix of the object that is being rendered. OpenGL 4x4 matrix that converts object local coordinates to world coordinates. In blender this is obtained from the 'matrix_world' attribute of the object.

Some uniform will need the *mat4_world_to_object* matrix, computed as the inverse of this matrix.

mat4_lamp_to_world Model matrix of the lamp lighting the object. OpenGL 4x4 matrix that converts lamp local coordinates to world coordinates. In blender this is obtained from the 'matrix_world' attribute of the lamp object.

Some uniform will need the *mat4_world_to_lamp* matrix computed as the inverse of this matrix.

gpu.GPU_DYNAMIC_OBJECT_VIEWMAT

The uniform is a 4x4 GL matrix that converts world coordinates to camera coordinates (see [mat4_world_to_cam](#)). Can be set once per frame. There is at most one uniform of that type per shader.

Value 1

gpu.GPU_DYNAMIC_OBJECT_MAT

The uniform is a 4x4 GL matrix that converts object coordinates to world coordinates (see [mat4_object_to_world](#)). Must be set before drawing the object. There is at most one uniform of that type per shader.

Value 2

gpu.GPU_DYNAMIC_OBJECT_VIEWIMAT

The uniform is a 4x4 GL matrix that converts coordinates in camera space to world coordinates (see [mat4_cam_to_world](#)). Can be set once per frame. There is at most one uniform of that type per shader.

Value 3

gpu.GPU_DYNAMIC_OBJECT_IMAT

The uniform is a 4x4 GL matrix that converts world coordinates to object coordinates (see [mat4_world_to_object](#)). Must be set before drawing the object. There is at most one uniform of that type per shader.

Value 4

gpu.GPU_DYNAMIC_OBJECT_COLOR

The uniform is a vector of 4 float representing a RGB color + alpha defined at object level. Each values between 0.0 and 1.0. In blender it corresponds to the 'color' attribute of the object. Must be set before drawing the object. There is at most one uniform of that type per shader.

Value 5

gpu.GPU_DYNAMIC_LAMP_DYNVEC

The uniform is a vector of 3 float representing the direction of light in camera space. In Blender, this is computed by

$\text{mat4_world_to_cam} * (-\text{vec3_lamp_Z_axis})$

as the lamp Z axis points to the opposite direction of light. The norm of the vector should be unity. Can be set once per frame. There is one uniform of that type per lamp lighting the material.

Value 6

gpu.GPU_DYNAMIC_LAMP_DYNCO

The uniform is a vector of 3 float representing the position of the light in camera space. Computed as

$\text{mat4_world_to_cam} * \text{vec3_lamp_pos}$

Can be set once per frame. There is one uniform of that type per lamp lighting the material.

Value 7

gpu.GPU_DYNAMIC_LAMP_DYNIMAT

The uniform is a 4x4 GL matrix that converts vector in camera space to lamp space. Computed as

$\text{mat4_world_to_lamp} * \text{mat4_cam_to_world}$

Can be set once per frame. There is one uniform of that type per lamp lighting the material.

Value 8

gpu.GPU_DYNAMIC_LAMP_DYNPERSMAT

The uniform is a 4x4 GL matrix that converts a vector in camera space to shadow buffer depth space. Computed as

$mat4_perspective_to_depth * mat4_lamp_to_perspective * mat4_world_to_lamp * mat4_cam_to_world$.
mat4_perspective_to_depth is a fixed matrix defined as follow:

```
0.5 0.0 0.0 0.5
0.0 0.5 0.0 0.5
0.0 0.0 0.5 0.5
0.0 0.0 0.0 1.0
```

This uniform can be set once per frame. There is one uniform of that type per lamp casting shadow in the scene.

Value 9

gpu.GPU_DYNAMIC_LAMP_DYNENERGY

The uniform is a single float representing the lamp energy. In blender it corresponds to the 'energy' attribute of the lamp data block. There is one uniform of that type per lamp lighting the material.

Value 10

gpu.GPU_DYNAMIC_LAMP_DYNCOL

The uniform is a vector of 3 float representing the lamp color. Color elements are between 0.0 and 1.0. In blender it corresponds to the 'color' attribute of the lamp data block. There is one uniform of that type per lamp lighting the material.

Value 11

gpu.GPU_DYNAMIC_SAMPLER_2DBUFFER

The uniform is an integer representing an internal texture used for certain effect (color band, etc).

Value 12

gpu.GPU_DYNAMIC_SAMPLER_2DIMAGE

The uniform is an integer representing a texture loaded from an image file.

Value 13

gpu.GPU_DYNAMIC_SAMPLER_2DSHADOW

The uniform is an integer representing a shadow buffer corresponding to a lamp casting shadow.

Value 14

GLSL attribute type

Type of the vertex attribute used in the GLSL shader. Determines the mesh custom data layer that contains the vertex attribute.

gpu.CD_MTFACE

Vertex attribute is a UV layer. Data type is vector of 2 float.

There can be more than one attribute of that type, they are differentiated by name. In blender, you can retrieve the attribute data with:

```
mesh.uv_textures[attribute['name']]
```

Value 5

gpu.CD_MCOL

Vertex attribute is color layer. Data type is vector 4 unsigned byte (RGBA).

There can be more than one attribute of that type, they are differentiated by name. In blender you can retrieve the attribute data with:

```
mesh.vertex_colors[attribute['name']]
```

Value 6

gpu.CD_ORCO

Vertex attribute is original coordinates. Data type is vector 3 float.

There can be only 1 attribute of that type per shader. In blender you can retrieve the attribute data with:

```
mesh.vertices
```

Value 14

gpu.CD_TANGENT

Vertex attribute is the tangent vector. Data type is vector 4 float.

There can be only 1 attribute of that type per shader. There is currently no way to retrieve this attribute data via the RNA API but a standalone C function to compute the tangent layer from the other layers can be obtained from blender.org.

Value 18

3.5.3 Functions

gpu.export_shader(*scene, material*)

Extracts the GLSL shader producing the visual effect of material in scene for the purpose of reusing the shader in an external engine. This function is meant to be used in material exporter so that the GLSL shader can be exported entirely. The return value is a dictionary containing the shader source code and all associated data.

Parameters

- **scene** (`bpy.types.Scene`) – the scene in which the material is rendered.
- **material** (`bpy.types.Material`) – the material that you want to export the GLSL shader

Returns the shader source code and all associated data in a dictionary

Return type dictionary

The dictionary contains the following elements:

- **'fragment'** [string] fragment shader source code.
- **'vertex'** [string] vertex shader source code.
- **'uniforms'** [sequence] list of uniforms used in fragment shader, can be empty list. Each element of the sequence is a dictionary with the following elements:
 - **'varname'** [string] name of the uniform in the fragment shader. Always of the form 'unf<number>'.
 - **'datatype'** [integer] data type of the uniform variable. Can be one of the following:
 - * `gpu.GPU_DATA_1I` : use `glUniform1i`
 - * `gpu.GPU_DATA_1F` : use `glUniform1fv`
 - * `gpu.GPU_DATA_2F` : use `glUniform2fv`

- * `gpu.GPU_DATA_3F` : use `glUniform3fv`
- * `gpu.GPU_DATA_4F` : use `glUniform4fv`
- * `gpu.GPU_DATA_9F` : use `glUniformMatrix3fv`
- * `gpu.GPU_DATA_16F` : use `glUniformMatrix4fv`
- **['type']** [integer] type of uniform, determines the origin and method of calculation. See `uniform-type`. Depending on the type, more elements will be present.
- **['lamp']** [`bpy.types.Object`] Reference to the lamp object from which the uniforms value are extracted. Set for the following uniforms types:
 - * `gpu.GPU_DYNAMIC_LAMP_DYNVEC`
 - * `gpu.GPU_DYNAMIC_LAMP_DYNCO`
 - * `gpu.GPU_DYNAMIC_LAMP_DYNIMAT`
 - * `gpu.GPU_DYNAMIC_LAMP_DYNPERSMAT`
 - * `gpu.GPU_DYNAMIC_LAMP_DYNENERGY`
 - * `gpu.GPU_DYNAMIC_LAMP_DYNCOL`
 - * `gpu.GPU_DYNAMIC_SAMPLER_2DSHADOW`

Notes:

- * The uniforms `gpu.GPU_DYNAMIC_LAMP_DYNVEC`, `gpu.GPU_DYNAMIC_LAMP_DYNCO`, `gpu.GPU_DYNAMIC_LAMP_DYNIMAT` and `gpu.GPU_DYNAMIC_LAMP_DYNPERSMAT` refer to the lamp object position and orientation, both of can be derived from the object world matrix:

```
obmat = uniform['lamp'].matrix_world
```

where `obmat` is the `mat4_lamp_to_world` matrix of the lamp as a 2 dimensional array, the lamp world location location is in `obmat[3]`.

- * The uniform types `gpu.GPU_DYNAMIC_LAMP_DYNENERGY` and `gpu.GPU_DYNAMIC_LAMP_DYNCOL` refer to the lamp data bloc that you get from:

```
la = uniform['lamp'].data
```

from which you get `la.energy` and `la.color`

- * Lamp duplication is not supported: if you have duplicated lamps in your scene (i.e. lamp that are instantiated by `dupligroup`, etc), this element will only give you a reference to the original lamp and you will not know which instance of the lamp it is referring too. You can still handle that case in the exporter by distributing the uniforms amongst the duplicated lamps.

- **['image']** [`bpy.types.Image`] Reference to the image databloc. Set for uniform type `gpu.GPU_DYNAMIC_SAMPLER_2DIMAGE`. You can get the image data from:

```
# full path to image file
uniform['image'].filepath
# image size as a 2-dimensional array of int
uniform['image'].size
```

- **['texnumber']** [integer] Channel number to which the texture is bound when drawing the object. Set for uniform types `gpu.GPU_DYNAMIC_SAMPLER_2DBUFFER`, `gpu.GPU_DYNAMIC_SAMPLER_2DIMAGE` and `gpu.GPU_DYNAMIC_SAMPLER_2DSHADOW`.

This is provided for information only: when reusing the shader outside blender, you are free to assign the textures to the channel of your choice and to pass that number channel to the GPU in the uniform.

- ['texpixels'] [byte array] texture data for uniform type `gpu.GPU_DYNAMIC_SAMPLER_2DBUFFER`. Although the corresponding uniform is a 2D sampler, the texture is always a 1D texture of $n \times 1$ pixel. The texture size n is provided in ['texsize'] element. These texture are only used for computer generated texture (colorband, etc). The texture data is provided so that you can make a real image out of it in the exporter.
- ['texsize'] [integer] horizontal size of texture for uniform type `gpu.GPU_DYNAMIC_SAMPLER_2DBUFFER`. The texture data is in ['texpixels'].
- ['attributes'] [sequence] list of attributes used in vertex shader, can be empty. Blender doesn't use standard attributes except for vertex position and normal. All other vertex attributes must be passed using the generic `glVertexAttrib` functions. The attribute data can be found in the derived mesh custom data using RNA. Each element of the sequence is a dictionary containing the following elements:
 - ['varname'] [string] name of the uniform in the vertex shader. Always of the form 'att<number>'.
 - ['datatype'] [integer] data type of vertex attribute, can be one of the following:
 - * `gpu.GPU_DATA_2F` : use `glVertexAttrib2fv`
 - * `gpu.GPU_DATA_3F` : use `glVertexAttrib3fv`
 - * `gpu.GPU_DATA_4F` : use `glVertexAttrib4fv`
 - * `gpu.GPU_DATA_4UB` : use `glVertexAttrib4ubv`
 - ['number'] [integer] generic attribute number. This is provided for information only. Blender doesn't use `glBindAttribLocation` to place generic attributes at specific location, it lets the shader compiler place the attributes automatically and query the placement with `glGetAttribLocation`. The result of this placement is returned in this element.

When using this shader in a render engine, you should either use `glBindAttribLocation` to force the attribute at this location or use `glGetAttribLocation` to get the placement chosen by the compiler of your GPU.
 - ['type'] [integer] type of the mesh custom data from which the vertex attribute is loaded. See [attribute-type](#).
 - ['name'] [string or integer] custom data layer name, used for attribute type `gpu.CD_MTFACE` and `gpu.CD_MCOL`.

Example:

```
import gpu
# get GLSL shader of material Mat.001 in scene Scene.001
scene = bpy.data.scenes['Scene.001']
material = bpy.data.materials['Mat.001']
shader = gpu.export_shader(scene,material)
# scan the uniform list and find the images used in the shader
for uniform in shader['uniforms']:
    if uniform['type'] == gpu.GPU_DYNAMIC_SAMPLER_2DIMAGE:
        print("uniform {0} is using image {1}".format(uniform['varname'], uniform['image'].filepath))
# scan the attribute list and find the UV layer used in the shader
for attribute in shader['attributes']:
    if attribute['type'] == gpu.CD_MTFACE:
        print("attribute {0} is using UV layer {1}".format(attribute['varname'], attribute['name']))
```

3.5.4 Notes

1. Calculation of the *mat4_lamp_to_perspective* matrix for a spot lamp.

The following pseudo code shows how the *mat4_lamp_to_perspective* matrix is computed in blender for uniforms of `gpu.GPU_DYNAMIC_LAMP_DYNPERSMAT` type:

```
#Get the lamp datablock with:
lamp=bpy.data.objects[uniform['lamp']].data

#Compute the projection matrix:
# You will need these lamp attributes:
# lamp.clipsta : near clip plane in world unit
# lamp.clipend : far clip plane in world unit
# lamp.spotsize : angle in degree of the spot light

#The size of the projection plane is computed with the usual formula:
wsize = lamp.clista * tan(lamp.spotsize/2)

#And the projection matrix:
mat4_lamp_to_perspective = glFrustum(-wsize,wsize,-wsize,wsize,lamp.clista,lamp.clipend)
```

2. Creation of the shadow map for a spot lamp.

The shadow map is the depth buffer of a render performed by placing the camera at the spot light position. The size of the shadow map is given by the attribute `lamp.bufsize` : shadow map size in pixel, same size in both dimensions.

3.6 Audio System (aud)

This module provides access to the audaspace audio library.

3.6.1 Basic Sound Playback

This script shows how to use the classes: `Device`, `Factory` and `Handle`.

```
import aud

device = aud.device()
# load sound file (it can be a video file with audio)
factory = aud.Factory('music.ogg')

# play the audio, this return a handle to control play/pause
handle = device.play(factory)
# if the audio is not too big and will be used often you can buffer it
factory_buffered = aud.Factory.buffer(factory)
handle_buffered = device.play(factory_buffered)

# stop the sounds (otherwise they play until their ends)
handle.stop()
handle_buffered.stop()
```

`device()`

Returns the application's `Device`.

return The application's `Device`.

rtype `Device`

constant value 3

constant value 0

constant value 1

constant value 2

constant value 5

constant value 6

constant value 0

constant value 1

constant value 2

constant value 3

constant value 4

constant value 36

constant value 40

constant value 0

constant value 18

constant value 19

constant value 20

constant value 1

constant value 0

constant value 2

constant value 1

class `aud.Device`

Device objects represent an audio output backend like OpenAL or SDL, but might also represent a file output or RAM buffer output.

`lock()`

Locks the device so that it's guaranteed, that no samples are read from the streams until `unlock()` is called. This is useful if you want to do start/stop/pause/resume some sounds at the same time.

Note: The device has to be unlocked as often as locked to be able to continue playback.

Warning: Make sure the time between locking and unlocking is as short as possible to avoid clicks.

`play(factory, keep=False)`

Plays a factory.

Parameters

- **factory** (`Factory`) – The factory to play.

- **keep** (*bool*) – See `Handle.keep`.

Returns The playback handle with which playback can be controlled with.

Return type `Handle`

`stopAll()`

Stops all playing and paused sounds.

`unlock()`

Unlocks the device after a lock call, see `lock()` for details.

channels

The channel count of the device.

distance_model

The distance model of the device.

See Also:

http://connect.creativelabs.com/openal/Documentation/OpenAL%201.1%20Specification.htm#_Toc199835864

doppler_factor

The doppler factor of the device. This factor is a scaling factor for the velocity vectors in doppler calculation. So a value bigger than 1 will exaggerate the effect as it raises the velocity.

format

The native sample format of the device.

listener_location

The listeners's location in 3D space, a 3D tuple of floats.

listener_orientation

The listener's orientation in 3D space as quaternion, a 4 float tuple.

listener_velocity

The listener's velocity in 3D space, a 3D tuple of floats.

rate

The sampling rate of the device in Hz.

speed_of_sound

The speed of sound of the device. The speed of sound in air is typically 343 m/s.

volume

The overall volume of the device.

class `aud.Factory`

Factory objects are immutable and represent a sound that can be played simultaneously multiple times. They are called factories because they create reader objects internally that are used for playback.

`file(filename)`

Creates a factory object of a sound file.

Parameters `filename` (*string*) – Path of the file.

Returns The created `Factory` object.

Return type `Factory`

<p>Warning: If the file doesn't exist or can't be read you will not get an exception immediately, but when you try to start playback of that factory.</p>
--

sine(frequency, rate=44100)

Creates a sine factory which plays a sine wave.

Parameters

- **frequency** (*float*) – The frequency of the sine wave in Hz.
- **rate** (*int*) – The sampling rate in Hz. It's recommended to set this value to the playback device's sampling rate to avoid resampling.

Returns The created `Factory` object.

Return type `Factory`

buffer()

Buffers a factory into RAM. This saves CPU usage needed for decoding and file access if the underlying factory reads from a file on the harddisk, but it consumes a lot of memory.

Returns The created `Factory` object.

Return type `Factory`

Note: Only known-length factories can be buffered.

Warning: Raw PCM data needs a lot of space, only buffer short factories.

delay(time)

Delays by playing adding silence in front of the other factory's data.

Parameters **time** (*float*) – How many seconds of silence should be added before the factory.

Returns The created `Factory` object.

Return type `Factory`

fadein(start, length)

Fades a factory in by raising the volume linearly in the given time interval.

Parameters

- **start** (*float*) – Time in seconds when the fading should start.
- **length** (*float*) – Time in seconds how long the fading should last.

Returns The created `Factory` object.

Return type `Factory`

Note: Before the fade starts it plays silence.

fadeout(start, length)

Fades a factory in by lowering the volume linearly in the given time interval.

Parameters

- **start** (*float*) – Time in seconds when the fading should start.
- **length** (*float*) – Time in seconds how long the fading should last.

Returns The created `Factory` object.

Return type `Factory`

Note: After the fade this factory plays silence, so that the length of the factory is not altered.

`filter(b, a = (1))`

Filters a factory with the supplied IIR filter coefficients. Without the second parameter you'll get a FIR filter. If the first value of the a sequence is 0 it will be set to 1 automatically. If the first value of the a sequence is neither 0 nor 1, all filter coefficients will be scaled by this value so that it is 1 in the end, you don't have to scale yourself.

Parameters

- **b** (*sequence of float*) – The nominator filter coefficients.
- **a** (*sequence of float*) – The denominator filter coefficients.

Returns The created `Factory` object.

Return type `Factory`

`highpass(frequency, Q=0.5)`

Creates a second order highpass filter based on the transfer function $H(s) = s^2 / (s^2 + s/Q + 1)$

Parameters

- **frequency** (*float*) – The cut off frequency of the highpass.
- **Q** (*float*) – Q factor of the lowpass.

Returns The created `Factory` object.

Return type `Factory`

`join(factory)`

Plays two factories in sequence.

Parameters **factory** (`Factory`) – The factory to play second.

Returns The created `Factory` object.

Return type `Factory`

Note: The two factories have to have the same specifications (channels and samplerate).

`limit(start, end)`

Limits a factory within a specific start and end time.

Parameters

- **start** (*float*) – Start time in seconds.
- **end** (*float*) – End time in seconds.

Returns The created `Factory` object.

Return type `Factory`

`loop(count)`

Loops a factory.

Parameters `count` (*integer*) – How often the factory should be looped. Negative values mean endlessly.

Returns The created `Factory` object.

Return type `Factory`

Note: This is a filter function, you might consider using `Handle.loop_count` instead.

`lowpass(frequency, Q=0.5)`

Creates a second order lowpass filter based on the transfer function $H(s) = 1 / (s^2 + s/Q + 1)$

Parameters

- **frequency** (*float*) – The cut off frequency of the lowpass.
- **Q** (*float*) – Q factor of the lowpass.

Returns The created `Factory` object.

Return type `Factory`

`mix(factory)`

Mixes two factories.

Parameters `factory` (`Factory`) – The factory to mix over the other.

Returns The created `Factory` object.

Return type `Factory`

Note: The two factories have to have the same specifications (channels and samplerate).

`pingpong()`

Plays a factory forward and then backward. This is like joining a factory with its reverse.

Returns The created `Factory` object.

Return type `Factory`

`pitch(factor)`

Changes the pitch of a factory with a specific factor.

Parameters `factor` (*float*) – The factor to change the pitch with.

Returns The created `Factory` object.

Return type `Factory`

Note: This is done by changing the sample rate of the underlying factory, which has to be an integer, so the factor value rounded and the factor may not be 100 % accurate.

Note: This is a filter function, you might consider using `Handle.pitch` instead.

`reverse()`

Plays a factory reversed.

Returns The created `Factory` object.

Return type `Factory`

Note: The factory has to have a finite length and has to be seekable. It's recommended to use this only with factories with fast and accurate seeking, which is not true for encoded audio files, such ones should be buffered using `buffer()` before being played reversed.

Warning: If seeking is not accurate in the underlying factory you'll likely hear skips/jumps/cracks.

`square(threshold = 0)`

Makes a square wave out of an audio wave by setting all samples with a amplitude \geq threshold to 1, all \leq -threshold to -1 and all between to 0.

Parameters **threshold** (*float*) – Threshold value over which an amplitude counts non-zero.

Returns The created `Factory` object.

Return type `Factory`

`volume(volume)`

Changes the volume of a factory.

Parameters **volume** (*float*) – The new volume..

Returns The created `Factory` object.

Return type `Factory`

Note: Should be in the range [0, 1] to avoid clipping.

Note: This is a filter function, you might consider using `Handle.volume` instead.

class `aud.Handle`

Handle objects are playback handles that can be used to control playback of a sound. If a sound is played back multiple times then there are as many handles.

`pause()`

Pauses playback.

Returns Whether the action succeeded.

Return type `bool`

`resume()`

Resumes playback.

Returns Whether the action succeeded.

Return type `bool`

`stop()`

Stops playback.

Returns Whether the action succeeded.

Return type `bool`

Note: This makes the handle invalid.

attenuation

This factor is used for distance based attenuation of the source.

See Also:

`Device.distance_model`

cone_angle_inner

The opening angle of the inner cone of the source. If the cone values of a source are set there are two (audible) cones with the apex at the `location` of the source and with infinite height, heading in the direction of the source's `orientation`. In the inner cone the volume is normal. Outside the outer cone the volume will be `cone_volume_outer` and in the area between the volume will be interpolated linearly.

cone_angle_outer

The opening angle of the outer cone of the source.

See Also:

`cone_angle_inner`

cone_volume_outer

The volume outside the outer cone of the source.

See Also:

`cone_angle_inner`

distance_maximum

The maximum distance of the source. If the listener is further away the source volume will be 0.

See Also:

`Device.distance_model`

distance_reference

The reference distance of the source. At this distance the volume will be exactly `volume`.

See Also:

`Device.distance_model`

keep

Whether the sound should be kept paused in the device when its end is reached. This can be used to seek the sound to some position and start playback again.

Warning: If this is set to true and you forget stopping this equals a memory leak as the handle exists until the device is destroyed.

location

The source's location in 3D space, a 3D tuple of floats.

loop_count

The (remaining) loop count of the sound. A negative value indicates infinity.

orientation

The source's orientation in 3D space as quaternion, a 4 float tuple.

pitch

The pitch of the sound.

position

The playback position of the sound in seconds.

relative

Whether the source's location, velocity and orientation is relative or absolute to the listener.

status

Whether the sound is playing, paused or stopped (=invalid).

velocity

The source's velocity in 3D space, a 3D tuple of floats.

volume

The volume of the sound.

volume_maximum

The maximum volume of the source.

See Also:

`Device.distance_model`

volume_minimum

The minimum volume of the source.

See Also:

`Device.distance_model`

class `aud.error`

3.7 Extra Utilities (bpy_extras)

Utility modules associated with the bpy module.

3.7.1 bpy_extras submodule (bpy_extras.anim_utils)

`bpy_extras.anim_utils.bake_action` (*frame_start*, *frame_end*, *frame_step=1*,
only_selected=False, *do_pose=True*, *do_object=True*,
do_constraint_clear=False, *do_clean=False*, *ac-*
tion=None)

Return an image from the file path with options to search multiple paths and return a placeholder if its not found.

Parameters

- **frame_start** (*int*) – First frame to bake.
- **frame_end** (*int*) – Last frame to bake.
- **frame_step** (*int*) – Frame step.
- **only_selected** (*bool*) – Only bake selected data.
- **do_pose** (*bool*) – Bake pose channels.
- **do_object** (*bool*) – Bake objects.
- **do_constraint_clear** (*bool*) – Remove constraints.

- **do_clean** (*bool*) – Remove redundant keyframes after baking.
- **action** (`bpy.types.Action` or `None`) – An action to bake the data into, or `None` for a new action to be created.

Returns an action or `None`

Return type `bpy.types.Action`

3.7.2 bpy_extras submodule (bpy_extras.object_utils)

`bpy_extras.object_utils.add_object_align_init` (*context, operator*)

Return a matrix using the operator settings and view context.

Parameters

- **context** (`bpy.types.Context`) – The context to use.
- **operator** (`bpy.types.Operator`) – The operator, checked for location and rotation properties.

Returns the matrix from the context and settings.

Return type `mathutils.Matrix`

`bpy_extras.object_utils.object_data_add` (*context, obdata, operator=None*)

Add an object using the view context and preference to initialize the location, rotation and layer.

Parameters

- **context** (`bpy.types.Context`) – The context to use.
- **obdata** (*valid object data type or None.*) – the data used for the new object.
- **operator** (`bpy.types.Operator`) – The operator, checked for location and rotation properties.

Returns the newly created object in the scene.

Return type `bpy.types.ObjectBase`

3.7.3 bpy_extras submodule (bpy_extras.io_utils)

`bpy_extras.io_utils.axis_conversion` (*from_forward='Y', from_up='Z', to_forward='Y', to_up='Z'*)

Each argument us an axis in ['X', 'Y', 'Z', '-X', '-Y', '-Z'] where the first 2 are a source and the second 2 are the target.

`bpy_extras.io_utils.axis_conversion_ensure` (*operator, forward_attr, up_attr*)

Function to ensure an operator has valid axis conversion settings, intended to be used from `bpy.types.Operator.check`.

Parameters

- **operator** (`bpy.types.Operator`) – the operator to access axis attributes from.
- **forward_attr** (*string*) – attribute storing the forward axis
- **up_attr** (*string*) – attribute storing the up axis

Returns True if the value was modified.

Return type `boolean`

`bpy_extras.io_utils.create_derived_objects` (*scene, ob*)

`bpy_extras.io_utils.free_derived_objects` (*ob*)

`bpy_extras.io_utils.unpack_list` (*list_of_tuples*)

`bpy_extras.io_utils.unpack_face_list` (*list_of_tuples*)

`bpy_extras.io_utils.path_reference` (*filepath, base_src, base_dst, mode='AUTO', copy_subdir='', copy_set=None, library=None*)

Return a filepath relative to a destination directory, for use with exporters.

Parameters

- **filepath** (*string*) – the file path to return, supporting blenders relative `//` prefix.
- **base_src** (*string*) – the directory the *filepath* is relative too (normally the blend file).
- **base_dst** (*string*) – the directory the *filepath* will be referenced from (normally the export path).
- **mode** (*string*) – the method used get the path in [`'AUTO'`, `'ABSOLUTE'`, `'RELATIVE'`, `'MATCH'`, `'STRIP'`, `'COPY'`]
- **copy_subdir** (*string*) – the subdirectory of *base_dst* to use when `mode='COPY'`.
- **copy_set** (*set*) – collect from/to pairs when `mode='COPY'`, pass to `path_reference_copy` when exporting is done.
- **library** (`bpy.types.Library` or `None`) – The library this path is relative to.

Returns the new filepath.

Return type `string`

`bpy_extras.io_utils.path_reference_copy` (*copy_set, report=<built-in function print>*)
Execute copying files of `path_reference`

Parameters

- **copy_set** (*set*) – set of (from, to) pairs to copy.
- **report** (*function*) – function used for reporting warnings, takes a string argument.

`bpy_extras.io_utils.unique_name` (*key, name, name_dict, name_max=-1, clean_func=None, sep='.'*)

Helper function for storing unique names which may have special characters stripped and restricted to a maximum length.

Parameters

- **key** (any hashable object associated with the *name*.) – unique item this name belongs to, `name_dict[key]` will be reused when available. This can be the object, mesh, material, etc instance its self.
- **name** (*string*) – The name used to create a unique value in *name_dict*.
- **name_dict** (*dict*) – This is used to cache namespace to ensure no collisions occur, this should be an empty dict initially and only modified by this function.
- **clean_func** (*function*) – Function to call on *name* before creating a unique value.
- **sep** (*string*) – Separator to use when between the name and a number when a duplicate name is found.

constant value (<built-in function EnumProperty>, {'default': 'AUTO', 'items': (('AUTO', 'Auto', 'Use Relative paths with subdirectories only'), ('ABSOLUTE', 'Absolute', 'Always write absolute paths'), ('RELATIVE', 'Relative', 'Always write relative patsh (where possible)'), ('MATCH', 'Match', 'Match Absolute/Relative setting with input path'), ('STRIP', 'Strip Path', 'Filename only'), ('COPY', 'Copy', 'copy the file to the destination path (or subdirectory)'),), 'attr': 'path_mode', 'description': 'Method used to reference paths', 'name': 'Path Mode'})

class bpy_extras.io_utils.ExportHelper

class bpy_extras.io_utils.ImportHelper

3.7.4 bpy_extras submodule (bpy_extras.image_utils)

bpy_extras.image_utils.load_image (imagepath, dirname='', place_holder=False, recursive=False, ncase_cmp=True, convert_callback=None, verbose=False)

Return an image from the file path with options to search multiple paths and return a placeholder if its not found.

Parameters

- **filepath** (*string*) – The image filename If a path precedes it, this will be searched as well.
- **dirname** (*string*) – is the directory where the image may be located - any file at the end will be ignored.
- **place_holder** (*bool*) – if True a new place holder image will be created. this is useful so later you can relink the image to its original data.
- **recursive** (*bool*) – If True, directories will be recursively searched. Be careful with this if you have files in your root directory because it may take a long time.
- **ncase_cmp** (*bool*) – on non windows systems, find the correct case for the file.
- **convert_callback** (*function*) – a function that takes an existing path and returns a new one. Use this when loading image formats blender may not support, the CONVERT_CALLBACK can take the path for a GIF (for example), convert it to a PNG and return the PNG's path. For formats blender can read, simply return the path that is given.

Returns an image or None

Return type `bpy.types.Image`

3.7.5 bpy_extras submodule (bpy_extras.keyconfig_utils)

bpy_extras.keyconfig_utils.keyconfig_export (wm, kc, filepath)

bpy_extras.keyconfig_utils.keyconfig_merge (kc1, kc2)
note: kc1 takes priority over kc2

bpy_extras.keyconfig_utils.keyconfig_test (kc)

bpy_extras.keyconfig_utils.km_exists_in (km, export_keymaps)

3.7.6 bpy_extras submodule (bpy_extras.mesh_utils)

bpy_extras.mesh_utils.mesh_linked_faces (mesh)

Splits the mesh into connected faces, use this for seperating cubes from other mesh elements within 1 mesh datablock.

Parameters `mesh` (`bpy.types.Mesh`) – the mesh used to group with.

Returns lists of lists containing faces.

Return type list

`bpy_extras.mesh_utils.edge_face_count_dict` (*mesh*)

Returns dict of edge keys with their value set to the number of faces using each edge.

Return type dict

`bpy_extras.mesh_utils.edge_face_count` (*mesh*)

Returns list face users for each item in `mesh.edges`.

Return type list

`bpy_extras.mesh_utils.edge_loops_from_faces` (*mesh, faces=None, seams=()*)

Edge loops defined by faces

Takes `me.faces` or a list of faces and returns the edge loops These edge loops are the edges that sit between quads, so they dont touch 1 quad, note: not connected will make 2 edge loops, both only containing 2 edges.

return a list of edge key lists `[(0, 1), (4, 8), (3, 8), ...]`

Parameters

- **mesh** (`bpy.types.Mesh`) – the mesh used to get edge loops from.
- **faces** (`bpy.types.MeshFaces`, sequence or or `NoneType`) – optional face list to only use some of the meshes faces.

Returns return a list of edge vertex index lists.

Return type list

`bpy_extras.mesh_utils.edge_loops_from_edges` (*mesh, edges=None*)

Edge loops defined by edges

Takes `me.edges` or a list of edges and returns the edge loops

return a list of vertex indices. `[1, 6, 7, 2], ...]`

closed loops have matching start and end values.

`bpy_extras.mesh_utils.ngon_tessellate` (*from_data, indices, fix_loops=True*)

Takes a polyline of indices (fgon) and returns a list of face indicie lists. Designed to be used for importers that need indices for an fgon to create from existing verts.

`from_data`: either a mesh, or a list/tuple of vectors. `indices`: a list of indices to use this list is the ordered closed polyline

to fill, and can be a subset of the data given.

fix_loops: If this is enabled polylines that use loops to make multiple polylines are delt with correctly.

`bpy_extras.mesh_utils.face_random_points` (*num_points, faces*)

Generates a list of random points over mesh faces.

Parameters

- **num_points** – the number of random points to generate on each face.
- **faces** (`bpy.types.MeshFaces`, sequence) – list of the faces to generate points on.

Returns list of random points over all faces.

Return type list

3.7.7 bpy_extras submodule (bpy_extras.view3d_utils)

`bpy_extras.view3d_utils.region_2d_to_vector_3d` (*region*, *rv3d*, *coord*)

Return a direction vector from the viewport at the specific 2d region coordinate.

Parameters

- **region** (`bpy.types.Region`) – region of the 3D viewport, typically `bpy.context.region`.
- **rv3d** (`bpy.types.RegionView3D`) – 3D region data, typically `bpy.context.space_data.region_3d`.
- **coord** (*2d vector*) – 2d coordinates relative to the region: (`event.mouse_region_x`, `event.mouse_region_y`) for example.

Returns normalized 3d vector.

Return type `mathutils.Vector`

`bpy_extras.view3d_utils.region_2d_to_location_3d` (*region*, *rv3d*, *coord*, *depth_location*)

Return a 3d location from the region relative 2d coords, aligned with *depth_location*.

Parameters

- **region** (`bpy.types.Region`) – region of the 3D viewport, typically `bpy.context.region`.
- **rv3d** (`bpy.types.RegionView3D`) – 3D region data, typically `bpy.context.space_data.region_3d`.
- **coord** (*2d vector*) – 2d coordinates relative to the region; (`event.mouse_region_x`, `event.mouse_region_y`) for example.
- **depth_location** (*3d vector*) – the returned vectors depth is aligned with this since there is no defined depth with a 2d region input.

Returns normalized 3d vector.

Return type `mathutils.Vector`

`bpy_extras.view3d_utils.location_3d_to_region_2d` (*region*, *rv3d*, *coord*)

Return the *region* relative 2d location of a 3d position.

Parameters

- **region** (`bpy.types.Region`) – region of the 3D viewport, typically `bpy.context.region`.
- **rv3d** (`bpy.types.RegionView3D`) – 3D region data, typically `bpy.context.space_data.region_3d`.
- **coord** (*3d vector*) – 3d worldspace location.

Returns 2d location

Return type `mathutils.Vector`

GAME ENGINE MODULES

4.1 Game Types (bge.types)

class `bge.types.PyObjectPlus`

PyObjectPlus base class of most other types in the Game Engine.

invalid

Test if the object has been freed by the game engine and is no longer valid.

Normally this is not a problem but when storing game engine data in the GameLogic module, `KX_Scenes` or other `KX_GameObjects` its possible to hold a reference to invalid data. Calling an attribute or method on an invalid object will raise a `SystemError`.

The invalid attribute allows testing for this case without exception handling.

Type boolean

class `bge.types.CValue` (*PyObjectPlus*)

This class is a basis for other classes.

name

The name of this CValue derived object (read-only).

Type string

class `bge.types.CPropValue` (*CValue*)

This class has no python functions

class `bge.types.SCA_ILogicBrick` (*CValue*)

Base class for all logic bricks.

executePriority

This determines the order controllers are evaluated, and actuators are activated (lower priority is executed first).

Type executePriority: int

owner

The game object this logic brick is attached to (read-only).

Type `KX_GameObject` or None in exceptional cases.

name

The name of this logic brick (read-only).

Type string

class `bge.types.SCA_PythonKeyboard` (*PyObjectPlus*)

The current keyboard.

events

A dictionary containing the status of each keyboard event or key. (read-only).

Type dictionary {*keycode:status, ...*}

class `bge.types.SCA_PythonMouse` (*PyObjectPlus*)

The current mouse.

events

a dictionary containing the status of each mouse event. (read-only).

Type dictionary {*keycode:status, ...*}

position

The normalized x and y position of the mouse cursor.

Type list [x, y]

visible

The visibility of the mouse cursor.

Type boolean

class `bge.types.SCA_IObject` (*CValue*)

This class has no python functions

class `bge.types.SCA_ISensor` (*SCA_ILogicBrick*)

Base class for all sensor logic bricks.

usePosPulseMode

Flag to turn positive pulse mode on and off.

Type boolean

useNegPulseMode

Flag to turn negative pulse mode on and off.

Type boolean

frequency

The frequency for pulse mode sensors.

Type integer

level

level Option whether to detect level or edge transition when entering a state. It makes a difference only in case of logic state transition (state actuator). A level detector will immediately generate a pulse, negative or positive depending on the sensor condition, as soon as the state is activated. A edge detector will wait for a state change before generating a pulse. note: mutually exclusive with `tap`, enabling will disable `tap`.

Type boolean

tap

When enabled only sensors that are just activated will send a positive event, after this they will be detected as negative by the controllers. This will make a key thats held act as if its only tapped for an instant. note: mutually exclusive with `level`, enabling will disable `level`.

Type boolean

invert

Flag to set if this sensor activates on positive or negative events.

Type boolean

triggered

True if this sensor brick is in a positive state. (read-only).

Type boolean

positive

True if this sensor brick is in a positive state. (read-only).

Type boolean

status

The status of the sensor (read-only): can be one of *these constants*.

Type int

Note: This convenient attribute combines the values of triggered and positive attributes.

reset ()

Reset sensor internal state, effect depends on the type of sensor and settings.

The sensor is put in its initial state as if it was just activated.

class `bge.types.SCA_IController` (*SCA_ILogicBrick*)

Base class for all controller logic bricks.

state

The controllers state bitmask. This can be used with the `GameObject`'s state to test if the controller is active.

Type int bitmask

sensors

A list of sensors linked to this controller.

Type sequence supporting index/string lookups and iteration.

Note: The sensors are not necessarily owned by the same object.

Note: When objects are instanced in dupligroups links may be lost from objects outside the dupligroup.

actuators

A list of actuators linked to this controller.

Type sequence supporting index/string lookups and iteration.

Note: The sensors are not necessarily owned by the same object.

Note: When objects are instanced in dupligroups links may be lost from objects outside the dupligroup.

useHighPriority

When set the controller executes always before all other controllers that dont have this set.

Type boolen

Note: Order of execution between high priority controllers is not guaranteed.

class `bge.types.SCA_IActor` (*SCAILogicBrick*)

Base class for all actuator logic bricks.

class `bge.types.BL_ActionActor` (*SCA_IActor*)

Action Actuators apply an action to an actor.

action

The name of the action to set as the current action.

Type string

channelNames

A list of channel names that may be used with `setChannel` and `getChannel`.

Type list of strings

frameStart

Specifies the starting frame of the animation.

Type float

frameEnd

Specifies the ending frame of the animation.

Type float

blendIn

Specifies the number of frames of animation to generate when making transitions between actions.

Type float

priority

Sets the priority of this actuator. Actuators with lower priority numbers will override actuators with higher numbers.

Type integer

frame

Sets the current frame for the animation.

Type float

propName

Sets the property to be used in FromProp playback mode.

Type string

blendTime

Sets the internal frame timer. This property must be in the range from 0.0 to `blendIn`.

Type float

mode

The operation mode of the actuator. Can be one of *these constants*.

Type integer

useContinue

The actions continue option, True or False. When True, the action will always play from where last left off, otherwise negative events to this actuator will reset it to its start frame.

Type boolean

framePropName

The name of the property that is set to the current frame number.

Type string

setChannel (*channel, matrix*)

Alternative to the 2 arguments, 4 arguments (channel, matrix, loc, size, quat) are also supported.

Parameters

- **channel** (*string*) – A string specifying the name of the bone channel, error raised if not in `channelNames`.
- **matrix** – A 4x4 matrix specifying the overriding transformation as an offset from the bone's rest position.
- **matrix** – list [[float]]

Note: These values are relative to the bones rest position, currently the api has no way to get this info (which is annoying), but can be worked around by using bones with a rest pose that has no translation.

getChannel (*channel*)

Parameters **channel** (*string*) – A string specifying the name of the bone channel. error raised if not in `channelNames`.

Returns (loc, size, quat)

Return type tuple

class `bge.types.BL_Shader` (*PyObjectPlus*)

BL_Shader GLSL shaders.

TODO - Description

setUniformfv (*name, fList*)

Set a uniform with a list of float values

Parameters

- **name** (*string*) – the uniform name
- **fList** (*list[float]*) – a list (2, 3 or 4 elements) of float values

delSource ()

Clear the shader. Use this method before the source is changed with `setSource`.

getFragmentProg ()

Returns the fragment program.

Returns The fragment program.

Return type string

getVertexProg ()

Get the vertex program.

Returns The vertex program.

Return type string

isValid ()

Check if the shader is valid.

Returns True if the shader is valid

Return type boolean

setAttrib (*enum*)

Set attribute location. (The parameter is ignored a.t.m. and the value of “tangent” is always used.)

Parameters **enum** (*integer*) – attribute location value

setNumberOfPasses (*max_pass*)

Set the maximum number of passes. Not used a.t.m.

Parameters **max_pass** (*integer*) – the maximum number of passes

setSampler (*name, index*)

Set uniform texture sample index.

Parameters

- **name** (*string*) – Uniform name
- **index** (*integer*) – Texture sample index.

setSource (*vertexProgram, fragmentProgram*)

Set the vertex and fragment programs

Parameters

- **vertexProgram** (*string*) – Vertex program
- **fragmentProgram** (*string*) – Fragment program

setUniform1f (*name, fx*)

Set a uniform with 1 float value.

Parameters

- **name** (*string*) – the uniform name
- **fx** (*float*) – Uniform value

setUniform1i (*name, ix*)

Set a uniform with an integer value.

Parameters

- **name** (*string*) – the uniform name
- **ix** (*integer*) – the uniform value

setUniform2f (*name, fx, fy*)

Set a uniform with 2 float values

Parameters

- **name** (*string*) – the uniform name
- **fx** (*float*) – first float value
- **fy** (*float*) – second float value

setUniform2i (*name, ix, iy*)

Set a uniform with 2 integer values

Parameters

- **name** (*string*) – the uniform name
- **ix** (*integer*) – first integer value
- **iy** (*integer*) – second integer value

setUniform3f (*name, fx, fy, fz*)

Set a uniform with 3 float values.

Parameters

- **name** (*string*) – the uniform name
- **fx** (*float*) – first float value
- **fy** (*float*) – second float value
- **fz** (*float*) – third float value

setUniform3i (*name, ix, iy, iz*)

Set a uniform with 3 integer values

Parameters

- **name** (*string*) – the uniform name
- **ix** (*integer*) – first integer value
- **iy** (*integer*) – second integer value
- **iz** (*integer*) – third integer value

setUniform4f (*name, fx, fy, fz, fw*)

Set a uniform with 4 float values.

Parameters

- **name** (*string*) – the uniform name
- **fx** (*float*) – first float value
- **fy** (*float*) – second float value
- **fz** (*float*) – third float value
- **fw** (*float*) – fourth float value

setUniform4i (*name, ix, iy, iz, iw*)

Set a uniform with 4 integer values

Parameters

- **name** (*string*) – the uniform name
- **ix** (*integer*) – first integer value
- **iy** (*integer*) – second integer value
- **iz** (*integer*) – third integer value
- **iw** (*integer*) – fourth integer value

setUniformDef (*name, type*)

Define a new uniform

Parameters

- **name** (*string*) – the uniform name
- **type** (*UNI_NONE, UNI_INT, UNI_FLOAT, UNI_INT2, UNI_FLOAT2, UNI_INT3, UNI_FLOAT3, UNI_INT4, UNI_FLOAT4, UNI_MAT3, UNI_MAT4, UNI_MAX*) – uniform type

setUniformMatrix3 (*name, mat, transpose*)

Set a uniform with a 3x3 matrix value

Parameters

- **name** (*string*) – the uniform name
- **mat** (*3x3 matrix*) – A 3x3 matrix $[[f, f, f], [f, f, f], [f, f, f]]$
- **transpose** (*boolean*) – set to True to transpose the matrix

setUniformMatrix4 (*name, mat, transpose*)

Set a uniform with a 4x4 matrix value

Parameters

- **name** (*string*) – the uniform name
- **mat** (*4x4 matrix*) – A 4x4 matrix $[[[f, f, f, f], [f, f, f, f], [f, f, f, f], [f, f, f, f]]]$
- **transpose** (*boolean*) – set to True to transpose the matrix

setUniformiv (*name, iList*)

Set a uniform with a list of integer values

Parameters

- **name** (*string*) – the uniform name
- **iList** (*list[integer]*) – a list (2, 3 or 4 elements) of integer values

validate ()

Validate the shader object.

class `bge.types.BL_ShapeActionActuator` (*SCA_IActuator*)

ShapeAction Actuators apply an shape action to an mesh object.

action

The name of the action to set as the current shape action.

Type string**frameStart**

Specifies the starting frame of the shape animation.

Type float**frameEnd**

Specifies the ending frame of the shape animation.

Type float**blendIn**

Specifies the number of frames of animation to generate when making transitions between actions.

Type float**priority**

Sets the priority of this actuator. Actuators will lower priority numbers will override actuators with higher numbers.

Type integer**frame**

Sets the current frame for the animation.

Type float**propName**

Sets the property to be used in FromProp playback mode.

Type string

blendTime

Sets the internal frame timer. This property must be in the range from 0.0 to `blendin`.

Type float

mode

The operation mode of the actuator. Can be one of *these constants*.

Type integer

framePropName

The name of the property that is set to the current frame number.

Type string

class `bge.types.CListValue` (*CPropValue*)

This is a list like object used in the game engine internally that behaves similar to a python list in most ways.

As well as the normal index lookup (`val= clist[i]`), `CListValue` supports string lookups (`val= scene.objects["Cube"]`)

Other operations such as `len(clist)`, `list(clist)`, `clist[0:10]` are also supported.

append (*val*)

Add an item to the list (like python's `append`)

Warning: Appending values to the list can cause crashes when the list is used internally by the game engine.

count (*val*)

Count the number of instances of a value in the list.

Returns number of instances

Return type integer

index (*val*)

Return the index of a value in the list.

Returns The index of the value in the list.

Return type integer

reverse ()

Reverse the order of the list.

get (*key*, *default=None*)

Return the value matching key, or the default value if its not found.

Returns The key value or a default.

from_id (*id*)

This is a funtion especially for the game engine to return a value with a specific id.

Since object names are not always unique, the id of an object can be used to get an object from the `CValueList`.

Example:

```
myObID=id(gameObject)
ob= scene.objects.from_id(myObID)
```

Where `myObjID` is an int or long from the `id` function.

This has the advantage that you can store the id in places you could not store a `gameObject`.

Warning: The id is derived from a memory location and will be different each time the game engine starts.

class `bge.types.KX_BlenderMaterial` (*PyObjectPlus*)

`KX_BlenderMaterial`

getShader ()

Returns the material's shader.

Returns the material's shader

Return type `BL_Shader`

setBlending (*src, dest*)

Set the pixel color arithmetic functions.

Parameters

- **src** – Specifies how the red, green, blue, and alpha source blending factors are computed.
- **dest** – Specifies how the red, green, blue, and alpha destination blending factors are computed.

getMaterialIndex ()

Returns the material's index.

Returns the material's index

Return type integer

class `bge.types.KX_CameraActuator` (*SCA_IActuator*)

Applies changes to a camera.

damping

strength of of the camera following movement.

Type float

min

minimum distance to the target object maintained by the actuator.

Type float

max

maximum distance to stay from the target object.

Type float

height

height to stay above the target object.

Type float

useXY

axis this actuator is tracking, True=X, False=Y.

Type boolean

object

the object this actuator tracks.

Type `KX_GameObject` or `None`

class `bge.types.KX_ConstraintActuator` (*SCA_IActuator*)

A constraint actuator limits the position, rotation, distance or orientation of an object.

damp

Time constant of the constraint expressed in frame (not use by Force field constraint).

Type `integer`

rotDamp

Time constant for the rotation expressed in frame (only for the distance constraint), 0 = use damp for rotation as well.

Type `integer`

direction

The reference direction in world coordinate for the orientation constraint.

Type 3-tuple of float: (x, y, z)

option

Binary combination of *these constants*

Type `integer`

time

activation time of the actuator. The actuator disables itself after this many frame. If set to 0, the actuator is not limited in time.

Type `integer`

propName

the name of the property or material for the ray detection of the distance constraint.

Type `string`

min

The lower bound of the constraint. For the rotation and orientation constraint, it represents radiant.

Type `float`

distance

the target distance of the distance constraint.

Type `float`

max

the upper bound of the constraint. For rotation and orientation constraints, it represents radiant.

Type `float`

rayLength

the length of the ray of the distance constraint.

Type `float`

limit

type of constraint. Use one of the *these constants*

Type `integer`.

class `bge.types.KX_ConstraintWrapper` (*PyObjectPlus*)

`KX_ConstraintWrapper`

getConstraintId (*val*)

Returns the constraint's ID

Returns the constraint's ID

Return type integer

class `bge.types.KX_GameActuator` (*SCA_IActuator*)

The game actuator loads a new .blend file, restarts the current .blend file or quits the game.

fileName

the new .blend file to load.

Type string

mode

The mode of this actuator. Can be on of *these constants*

Type Int

class `bge.types.KX_GameObject` (*SCA_IObject*)

All game objects are derived from this class.

Properties assigned to game objects are accessible as attributes of this class.

Note: Calling ANY method or attribute on an object that has been removed from a scene will raise a SystemError, if an object may have been removed since last accessing it use the `invalid` attribute to check.

name

The object's name. (read-only).

Type string

mass

The object's mass

Type float

Note: The object must have a physics controller for the mass to be applied, otherwise the mass value will be returned as 0.0.

linVelocityMin

Enforces the object keeps moving at a minimum velocity.

Type float

Note: Applies to dynamic and rigid body objects only.

Note: A value of 0.0 disables this option.

Note: While objects are stationary the minimum velocity will not be applied.

linVelocityMax

Clamp the maximum linear velocity to prevent objects moving beyond a set speed.

Type float

Note: Applies to dynamic and rigid body objects only.

Note: A value of 0.0 disables this option (rather than setting it stationary).

localInertia

the object's inertia vector in local coordinates. Read only.

Type list [ix, iy, iz]

parent

The object's parent object. (read-only).

Type `KX_GameObject` or None

visible

visibility flag.

Type boolean

Note: Game logic will still run for invisible objects.

color

The object color of the object. [r, g, b, a]

Type `mathutils.Vector`

occlusion

occlusion capability flag.

Type boolean

position

The object's position. [x, y, z] On write: local position, on read: world position Deprecated since version use: `localPosition` and `worldPosition`.

Type `mathutils.Vector`

orientation

The object's orientation. 3x3 Matrix. You can also write a Quaternion or Euler vector. On write: local orientation, on read: world orientation Deprecated since version use: `localOrientation` and `worldOrientation`.

Type `mathutils.Matrix`

scaling

The object's scaling factor. [sx, sy, sz] On write: local scaling, on read: world scaling Deprecated since version use: `localScale` and `worldScale`.

Type `mathutils.Vector`

localOrientation

The object's local orientation. 3x3 Matrix. You can also write a Quaternion or Euler vector.

Type `mathutils.Matrix`

worldOrientation

The object's world orientation. 3x3 Matrix.

Type `mathutils.Matrix`

localScale

The object's local scaling factor. [sx, sy, sz]

Type `mathutils.Vector`

worldScale

The object's world scaling factor. Read-only. [sx, sy, sz]

Type `mathutils.Vector`

localPosition

The object's local position. [x, y, z]

Type `mathutils.Vector`

worldPosition

The object's world position. [x, y, z]

Type `mathutils.Vector`

localLinearVelocity

The object's local linear velocity. [x, y, z]

Type `mathutils.Vector`

worldLinearVelocity

The object's world linear velocity. [x, y, z]

type `mathutils.Vector`

localAngularVelocity

The object's local angular velocity. [x, y, z]

type `mathutils.Vector`

worldAngularVelocity

The object's world angular velocity. [x, y, z]

type `mathutils.Vector`

timeOffset

adjust the slowparent delay at runtime.

Type `float`

state

the game object's state bitmask, using the first 30 bits, one bit must always be set.

Type `int`

meshes

a list meshes for this object.

Type list of `KX_MeshProxy`

Note: Most objects use only 1 mesh.

Note: Changes to this list will not update the `KX_GameObject`.

sensors

a sequence of `SCA_ISensor` objects with string/index lookups and iterator support.

Type list

Note: This attribute is experimental and may be removed (but probably wont be).

Note: Changes to this list will not update the KX_GameObject.

controllers

a sequence of `SCA_IController` objects with string/index lookups and iterator support.

Type list of `SCA_ISensor`

Note: This attribute is experimental and may be removed (but probably wont be).

Note: Changes to this list will not update the KX_GameObject.

actuators

a list of `SCA_IActuator` with string/index lookups and iterator support.

Type list

Note: This attribute is experimental and may be removed (but probably wont be).

Note: Changes to this list will not update the KX_GameObject.

attrDict

get the objects internal python attribute dictionary for direct (faster) access.

Type dict

children

direct children of this object, (read-only).

Type `CListValue` of `KX_GameObject`'s

childrenRecursive

all children of this object including childrens children, (read-only).

Type `CListValue` of `KX_GameObject`'s

endObject ()

Delete this object, can be used in place of the EndObject Actuator.

The actual removal of the object from the scene is delayed.

replaceMesh (*mesh, useDisplayMesh=True, usePhysicsMesh=False*)

Replace the mesh of this object with a new mesh. This works the same was as the actuator.

Parameters

- **mesh** (`MeshProxy` or string) – mesh to replace or the meshes name.
- **useDisplayMesh** (*boolean*) – when enabled the display mesh will be replaced (optional argument).
- **usePhysicsMesh** (*boolean*) – when enabled the physics mesh will be replaced (optional argument).

setVisible (*visible, recursive*)

Sets the game object's visible flag.

Parameters

- **visible** (*boolean*) – the visible state to set.
- **recursive** (*boolean*) – optional argument to set all childrens visibility flag too.

setOcclusion (*occlusion, recursive*)

Sets the game object's occlusion capability.

Parameters

- **occlusion** (*boolean*) – the state to set the occlusion to.
- **recursive** (*boolean*) – optional argument to set all childrens occlusion flag too.

alignAxisToVect (*vect, axis=2, factor=1.0*)

Aligns any of the game object's axis along the given vector.

Parameters

- **vect** (*3D vector*) – a vector to align the axis.
- **axis** (*integer*) – The axis you want to align
 - 0: X axis
 - 1: Y axis
 - 2: Z axis
- **factor** (*float*) – Only rotate a feaction of the distance to the target vector (0.0 - 1.0)

getAxisVect (*vect*)

Returns the axis vector rotates by the objects worldspace orientation. This is the equivalent of multiplying the vector by the orientation matrix.

Parameters **vect** (*3D Vector*) – a vector to align the axis.

Returns The vector in relation to the objects rotation.

Return type 3d vector.

applyMovement (*movement, local=False*)

Sets the game object's movement.

Parameters

- **movement** (*3D Vector*) – movement vector.
- **local** –
 - False: you get the “global” movement ie: relative to world orientation.
 - True: you get the “local” movement ie: relative to object orientation.
- **local** – boolean

applyRotation (*rotation, local=False*)

Sets the game object's rotation.

Parameters

- **rotation** (*3D Vector*) – rotation vector.
- **local** –

- False: you get the “global” rotation ie: relative to world orientation.
- True: you get the “local” rotation ie: relative to object orientation.
- **local** – boolean

applyForce (*force*, *local=False*)

Sets the game object’s force.

This requires a dynamic object.

Parameters

- **force** (*3D Vector*) – force vector.
- **local** (*boolean*) –
 - False: you get the “global” force ie: relative to world orientation.
 - True: you get the “local” force ie: relative to object orientation.

applyTorque (*torque*, *local=False*)

Sets the game object’s torque.

This requires a dynamic object.

Parameters

- **torque** (*3D Vector*) – torque vector.
- **local** (*boolean*) –
 - False: you get the “global” torque ie: relative to world orientation.
 - True: you get the “local” torque ie: relative to object orientation.

getLinearVelocity (*local=False*)

Gets the game object’s linear velocity.

This method returns the game object’s velocity through it’s centre of mass, ie no angular velocity component.

Parameters **local** (*boolean*) –

- False: you get the “global” velocity ie: relative to world orientation.
- True: you get the “local” velocity ie: relative to object orientation.

Returns the object’s linear velocity.

Return type list [vx, vy, vz]

setLinearVelocity (*velocity*, *local=False*)

Sets the game object’s linear velocity.

This method sets game object’s velocity through it’s centre of mass, ie no angular velocity component.

This requires a dynamic object.

Parameters

- **velocity** (*3D Vector*) – linear velocity vector.
- **local** (*boolean*) –
 - False: you get the “global” velocity ie: relative to world orientation.
 - True: you get the “local” velocity ie: relative to object orientation.

getAngularVelocity (*local=False*)

Gets the game object's angular velocity.

Parameters *local* (*boolean*) –

- False: you get the “global” velocity ie: relative to world orientation.
- True: you get the “local” velocity ie: relative to object orientation.

Returns the object's angular velocity.

Return type list [vx, vy, vz]

setAngularVelocity (*velocity, local=False*)

Sets the game object's angular velocity.

This requires a dynamic object.

Parameters

- **velocity** (*boolean*) – angular velocity vector.
- **local** –
 - False: you get the “global” velocity ie: relative to world orientation.
 - True: you get the “local” velocity ie: relative to object orientation.

getVelocity (*point=(0, 0, 0)*)

Gets the game object's velocity at the specified point.

Gets the game object's velocity at the specified point, including angular components.

Parameters *point* (*3D Vector*) – optional point to return the velocity for, in local coordinates.

Returns the velocity at the specified point.

Return type list [vx, vy, vz]

getReactionForce ()

Gets the game object's reaction force.

The reaction force is the force applied to this object over the last simulation timestep. This also includes impulses, eg from collisions.

Returns the reaction force of this object.

Return type list [fx, fy, fz]

Note: This is not implimented at the moment.

applyImpulse (*point, impulse*)

Applies an impulse to the game object.

This will apply the specified impulse to the game object at the specified point. If point != position, applyImpulse will also change the object's angular momentum. Otherwise, only linear momentum will change.

Parameters *point* (*the point to apply the impulse to (in world coordinates)*) – the point to apply the impulse to (in world coordinates)

suspendDynamics ()

Suspends physics for this object.

restoreDynamics ()

Resumes physics for this object.

Note: The objects linear velocity will be applied from when the dynamics were suspended.

enableRigidBody ()

Enables rigid body physics for this object.

Rigid body physics allows the object to roll on collisions.

Note: This is not working with bullet physics yet.

disableRigidBody ()

Disables rigid body physics for this object.

Note: This is not working with bullet physics yet. The angular is removed but rigid body physics can still rotate it later.

setParent (parent, compound=True, ghost=True)

Sets this object's parent. Control the shape status with the optional compound and ghost parameters:

In that case you can control if it should be ghost or not:

Parameters

- **parent** (*KX_GameObject*) – new parent object.
 - **compound** (*boolean*) – whether the shape should be added to the parent compound shape.
 - True: the object shape should be added to the parent compound shape.
 - False: the object should keep its individual shape.
 - **ghost** (*boolean*) – whether the object should be ghost while parented.
 - True: if the object should be made ghost while parented.
 - False: if the object should be solid while parented.
-

Note: If the object type is sensor, it stays ghost regardless of ghost parameter

removeParent ()

Removes this objects parent.

getPhysicsId ()

Returns the user data object associated with this game object's physics controller.

getPropertyNames ()

Gets a list of all property names.

Returns All property names for this object.

Return type list

getDistanceTo (other)

Parameters **other** (*KX_GameObject* or list [x, y, z]) – a point or another *KX_GameObject* to measure the distance to.

Returns distance to another object or point.

Return type float

getVectTo (*other*)

Returns the vector and the distance to another object or point. The vector is normalized unless the distance is 0, in which a zero length vector is returned.

Parameters **other** (`KX_GameObject` or list [x, y, z]) – a point or another `KX_GameObject` to get the vector and distance to.

Returns (distance, `globalVector(3)`, `localVector(3)`)

Return type 3-tuple (float, 3-tuple (x, y, z), 3-tuple (x, y, z))

rayCastTo (*other, dist, prop*)

Look towards another point/object and find first object hit within dist that matches prop.

The ray is always casted from the center of the object, ignoring the object itself. The ray is casted towards the center of another object or an explicit [x, y, z] point. Use `rayCast()` if you need to retrieve the hit point

Parameters

- **other** (`KX_GameObject` or 3-tuple) – [x, y, z] or object towards which the ray is casted
- **dist** (*float*) – max distance to look (can be negative => look behind); 0 or omitted => detect up to other
- **prop** (*string*) – property name that object must have; can be omitted => detect any object

Returns the first object hit or None if no object or object does not match prop

Return type `KX_GameObject`

rayCast (*objto, objfrom, dist, prop, face, xray, poly*)

Look from a point/object to another point/object and find first object hit within dist that matches prop. if poly is 0, returns a 3-tuple with object reference, hit point and hit normal or (None, None, None) if no hit. if poly is 1, returns a 4-tuple with in addition a `KX_PolyProxy` as 4th element. if poly is 2, returns a 5-tuple with in addition a 2D vector with the UV mapping of the hit point as 5th element.

```
# shoot along the axis gun-gunAim (gunAim should be collision-free)
obj, point, normal = gun.rayCast(gunAim, None, 50)
if obj:
    # do something
    pass
```

The face parameter determines the orientation of the normal.

- 0 => hit normal is always oriented towards the ray origin (as if you casted the ray from outside)
- 1 => hit normal is the real face normal (only for mesh object, otherwise face has no effect)

The ray has X-Ray capability if xray parameter is 1, otherwise the first object hit (other than self object) stops the ray. The prop and xray parameters interact as follow.

- prop off, xray off: return closest hit or no hit if there is no object on the full extend of the ray.
- prop off, xray on : idem.
- prop on, xray off: return closest hit if it matches prop, no hit otherwise.
- prop on, xray on : return closest hit matching prop or no hit if there is no object matching prop on the full extend of the ray.

The `KX_PolyProxy` 4th element of the return tuple when `poly=1` allows to retrieve information on the polygon hit by the ray. If there is no hit or the hit object is not a static mesh, `None` is returned as 4th element.

The ray ignores collision-free objects and faces that dont have the collision flag enabled, you can however use ghost objects.

Parameters

- **objto** (`KX_GameObject` or 3-tuple) – [x, y, z] or object to which the ray is casted
- **objfrom** (`KX_GameObject` or 3-tuple or `None`) – [x, y, z] or object from which the ray is casted; `None` or omitted => use self object center
- **dist** (*float*) – max distance to look (can be negative => look behind); 0 or omitted => detect up to to
- **prop** (*string*) – property name that object must have; can be omitted or "" => detect any object
- **face** (*integer*) – normal option: 1=>return face normal; 0 or omitted => normal is oriented towards origin
- **xray** (*integer*) – X-ray option: 1=>skip objects that don't match prop; 0 or omitted => stop on first object
- **poly** (*integer*) – polygon option: 0, 1 or 2 to return a 3-, 4- or 5-tuple with information on the face hit.
 - 0 or omitted: return value is a 3-tuple (object, hitpoint, hitnormal) or (`None`, `None`, `None`) if no hit
 - 1: return value is a 4-tuple and the 4th element is a `KX_PolyProxy` or `None` if no hit or the object doesn't use a mesh collision shape.
 - 2: return value is a 5-tuple and the 5th element is a 2-tuple (u, v) with the UV mapping of the hit point or `None` if no hit, or the object doesn't use a mesh collision shape, or doesn't have a UV mapping.

Returns

(object, hitpoint, hitnormal) or (object, hitpoint, hitnormal, polygon) or (object, hitpoint, hitnormal, polygon, hituv).

- object, hitpoint and hitnormal are `None` if no hit.
- polygon is valid only if the object is valid and is a static object, a dynamic object using mesh collision shape or a soft body object, otherwise it is `None`
- hituv is valid only if polygon is valid and the object has a UV mapping, otherwise it is `None`

Return type

- 3-tuple (`KX_GameObject`, 3-tuple (x, y, z), 3-tuple (nx, ny, nz))
- or 4-tuple (`KX_GameObject`, 3-tuple (x, y, z), 3-tuple (nx, ny, nz), `PolyProxy`)
- or 5-tuple (`KX_GameObject`, 3-tuple (x, y, z), 3-tuple (nx, ny, nz), `PolyProxy`, 2-tuple (u, v))

Note: The ray ignores the object on which the method is called. It is casted from/to object center or explicit [x, y, z] points.

setCollisionMargin (*margin*)
Set the objects collision margin.

Parameters *margin* (*float*) – the collision margin distance in blender units.

Note: If this object has no physics controller (a physics ID of zero), this function will raise RuntimeError.

sendMessage (*subject*, *body=""*, *to=""*)
Sends a message.

Parameters

- **subject** (*string*) – The subject of the message
- **body** (*string*) – The body of the message (optional)
- **to** (*string*) – The name of the object to send the message to (optional)

reinstancePhysicsMesh (*gameObject*, *meshObject*)
Updates the physics system with the changed mesh.

If no arguments are given the physics mesh will be re-created from the first mesh assigned to the game object.

Parameters

- **gameObject** (*string*, *KX_GameObject* or *None*) – optional argument, set the physics shape from this gameObjects mesh.
- **meshObject** (*string*, *MeshProxy* or *None*) – optional argument, set the physics shape from this mesh.

Returns True if reinstance succeeded, False if it failed.

Return type boolean

Note: If this object has instances the other instances will be updated too.

Note: The gameObject argument has an advantage that it can convert from a mesh with modifiers applied (such as subsurf).

Warning: Only triangle mesh type objects are supported currently (not convex hull)

Warning: If the object is a part of a compound object it will fail (parent or child)

Warning: Rebuilding the physics mesh can be slow, running many times per second will give a performance hit.

get (*key*, *default=None*)

Return the value matching key, or the default value if its not found. :return: The key value or a default.

playAction (*name*, *start_frame*, *end_frame*, *layer=0*, *priority=0*, *blendin=0*,
play_mode=ACT_MODE_PLAY, *layer_weight=0.0*, *ipo_flags=0*, *speed=1.0*)

Plays an action.

Parameters

- **name** (*string*) – the name of the action
- **start** (*float*) – the start frame of the action
- **end** (*float*) – the end frame of the action
- **layer** (*integer*) – the layer the action will play in (actions in different layers are added/blended together)
- **priority** (*integer*) – only play this action if there isn't an action currently playing in this layer with a higher (lower number) priority
- **blendin** (*float*) – the amount of blending between this animation and the previous one on this layer
- **play_mode** (*KX_ACTION_MODE_PLAY, KX_ACTION_MODE_LOOP, or KX_ACTION_MODE_PING_PONG*) – the play mode
- **layer_weight** (*float*) – how much of the previous layer to use for blending (0 = add)
- **ipo_flags** (*int bitfield*) – flags for the old IPO behaviors (force, etc)
- **speed** (*float*) – the playback speed of the action as a factor (1.0 = normal speed, 2.0 = 2x speed, etc)

stopAction (*layer=0*)

Stop playing the action on the given layer.

Parameters **layer** (*integer*) – The layer to stop playing.

getActionFrame (*layer=0*)

Gets the current frame of the action playing in the supplied layer.

Parameters **layer** (*integer*) – The layer that you want to get the frame from.

Returns The current frame of the action

Return type float

setActionFrame (*frame, layer=0*)

Set the current frame of the action playing in the supplied layer.

Parameters

- **layer** (*integer*) – The layer where you want to set the frame
- **frame** (*float*) – The frame to set the action to

isPlayingAction (*layer=0*)

Checks to see if there is an action playing in the given layer.

Parameters **layer** (*integer*) – The layer to check for a playing action.

Returns Whether or not the action is playing

Return type boolean

class `bge.types.KX_IpoActuator` (*SCA_IActuator*)

IPO actuator activates an animation.

frameStart

Start frame.

Type float

frameEnd

End frame.

Type float

propName

Use this property to define the Ipo position.

Type string

framePropName

Assign this property this action current frame number.

Type string

mode

Play mode for the ipo. Can be on of *these constants*

Type integer

useIpoAsForce

Apply Ipo as a global or local force depending on the local option (dynamic objects only).

Type boolean

useIpoAdd

Ipo is added to the current loc/rot/scale in global or local coordinate according to Local flag.

Type boolean

useIpoLocal

Let the ipo acts in local coordinates, used in Force and Add mode.

Type boolean

useChildren

Update IPO on all children Objects as well.

Type boolean

class `bge.types.KX_LightObject` (*KX_GameObject*)

A Light object.

```
# Turn on a red alert light.
```

```
import bge
```

```
co = bge.logic.getCurrentController()
```

```
light = co.owner
```

```
light.energy = 1.0
```

```
light.colour = [1.0, 0.0, 0.0]
```

SPOT

A spot light source. See attribute `type`

SUN

A point light source with no attenuation. See attribute `type`

NORMAL

A point light source. See attribute `type`

type

The type of light - must be SPOT, SUN or NORMAL

layer

The layer mask that this light affects object on.

Type bitfield

energy

The brightness of this light.

Type float

distance

The maximum distance this light can illuminate. (SPOT and NORMAL lights only).

Type float

colour

The colour of this light. Black = [0.0, 0.0, 0.0], White = [1.0, 1.0, 1.0].

Type list [r, g, b]

color

Synonym for colour.

lin_attenuation

The linear component of this light's attenuation. (SPOT and NORMAL lights only).

Type float

quad_attenuation

The quadratic component of this light's attenuation (SPOT and NORMAL lights only).

Type float

spotsize

The cone angle of the spot light, in degrees (SPOT lights only).

Type float in [0 - 180].

spotblend

Specifies the intensity distribution of the spot light (SPOT lights only).

Type float in [0 - 1]

Note: Higher values result in a more focused light source.

class `bge.types.KX_MeshProxy` (*SCA_IObject*)

A mesh object.

You can only change the vertex properties of a mesh object, not the mesh topology.

To use mesh objects effectively, you should know a bit about how the game engine handles them.

- 1.Mesh Objects are converted from Blender at scene load.
- 2.The Converter groups polygons by Material. This means they can be sent to the renderer efficiently. A material holds:
 - (a)The texture.
 - (b)The Blender material.
 - (c)The Tile properties
 - (d)The face properties - (From the "Texture Face" panel)
 - (e)Transparency & z sorting
 - (f)Light layer
 - (g)Polygon shape (triangle/quad)

(h)Game Object

3.Verticies will be split by face if necessary. Verticies can only be shared between faces if:

(a)They are at the same position

(b)UV coordinates are the same

(c)Their normals are the same (both polygons are “Set Smooth”)

(d)They are the same colour, for example: a cube has 24 verticies: 6 faces with 4 verticies per face.

The correct method of iterating over every `KX_VertexProxy` in a game object

```
import GameLogic

co = GameLogic.getCurrentController()
obj = co.owner

m_i = 0
mesh = obj.getMesh(m_i) # There can be more than one mesh...
while mesh != None:
    for mat in range(mesh.getNumMaterials()):
        for v_index in range(mesh.getVertexArrayLength(mat)):
            vertex = mesh.getVertex(mat, v_index)
            # Do something with vertex here...
            # ... eg: colour the vertex red.
            vertex.colour = [1.0, 0.0, 0.0, 1.0]
        m_i += 1
    mesh = obj.getMesh(m_i)
```

materials

Type list of `KX_BlenderMaterial` or `KX_PolygonMaterial` types

numPolygons

Type integer

numMaterials

Type integer

getNumMaterials()

Returns number of materials associated with this object

Return type integer

getMaterialName(matid)

Gets the name of the specified material.

Parameters `matid` (*integer*) – the specified material.

Returns the attached material name.

Return type string

getTextureName(matid)

Gets the name of the specified material’s texture.

Parameters `matid` (*integer*) – the specified material

Returns the attached material’s texture name.

Return type string

getVertexArrayLength (*matid*)

Gets the length of the vertex array associated with the specified material.

There is one vertex array for each material.

Parameters **matid** (*integer*) – the specified material

Returns the number of vertices in the vertex array.

Return type integer

getVertex (*matid, index*)

Gets the specified vertex from the mesh object.

Parameters

- **matid** (*integer*) – the specified material
- **index** (*integer*) – the index into the vertex array.

Returns a vertex object.

Return type `KX_VertexProxy`

getNumPolygons ()

Returns The number of polygon in the mesh.

Return type integer

getPolygon (*index*)

Gets the specified polygon from the mesh.

Parameters **index** (*integer*) – polygon number

Returns a polygon object.

Return type `PolyProxy`

class `bge.types.SCA_MouseSensor` (*SCA_ISensor*)

Mouse Sensor logic brick.

position

current [x, y] coordinates of the mouse, in frame coordinates (pixels).

Type [integer, integer]

mode

sensor mode.

Type integer

- `KX_MOUSESENSORMODE_LEFTBUTTON(1)`
- `KX_MOUSESENSORMODE_MIDDLEBUTTON(2)`
- `KX_MOUSESENSORMODE_RIGHTBUTTON(3)`
- `KX_MOUSESENSORMODE_WHEELUP(4)`
- `KX_MOUSESENSORMODE_WHEELDOWN(5)`
- `KX_MOUSESENSORMODE_MOVEMENT(6)`

getButtonStatus (*button*)

Get the mouse button status.

Parameters **button** (*int*) – The code that represents the key you want to get the state of, use one of *these constants*

Returns The state of the given key, can be one of *these constants*

Return type int

class `bge.types.KX_MouseFocusSensor` (*SCA_MouseSensor*)

The mouse focus sensor detects when the mouse is over the current game object.

The mouse focus sensor works by transforming the mouse coordinates from 2d device space to 3d space then raycasting away from the camera.

raySource

The worldspace source of the ray (the view position).

Type list (vector of 3 floats)

rayTarget

The worldspace target of the ray.

Type list (vector of 3 floats)

rayDirection

The `rayTarget - raySource` normalized.

Type list (normalized vector of 3 floats)

hitObject

the last object the mouse was over.

Type `KX_GameObject` or None

hitPosition

The worldspace position of the ray intersection.

Type list (vector of 3 floats)

hitNormal

the worldspace normal from the face at point of intersection.

Type list (normalized vector of 3 floats)

hitUV

the UV coordinates at the point of intersection.

Type list (vector of 2 floats)

If the object has no UV mapping, it returns [0, 0].

The UV coordinates are not normalized, they can be < 0 or > 1 depending on the UV mapping.

usePulseFocus

When enabled, moving the mouse over a different object generates a pulse. (only used when the 'Mouse Over Any' sensor option is set).

Type boolean

class `bge.types.KX_TouchSensor` (*SCA_ISensor*)

Touch sensor detects collisions between objects.

propName

The property or material to collide with.

Type string

useMaterial

Determines if the sensor is looking for a property or material. `KX_True` = Find material; `KX_False` = Find property.

Type boolean

usePulseCollision

When enabled, changes to the set of colliding objects generate a pulse.

Type boolean

hitObject

The last collided object. (read-only).

Type `KX_GameObject` or None

hitObjectList

A list of colliding objects. (read-only).

Type `CListValue` of `KX_GameObject`

class `bge.types.KX_NearSensor` (*`KX_TouchSensor`*)

A near sensor is a specialised form of touch sensor.

distance

The near sensor activates when an object is within this distance.

Type float

resetDistance

The near sensor deactivates when the object exceeds this distance.

Type float

class `bge.types.KX_NetworkMessageActuator` (*`SCA_IActuator`*)

Message Actuator

propName

Messages will only be sent to objects with the given property name.

Type string

subject

The subject field of the message.

Type string

body

The body of the message.

Type string

usePropBody

Send a property instead of a regular body message.

Type boolean

class `bge.types.KX_NetworkMessageSensor` (*`SCA_ISensor`*)

The Message Sensor logic brick.

Currently only loopback (local) networks are supported.

subject

The subject the sensor is looking for.

Type string

frameMessageCount

The number of messages received since the last frame. (read-only).

Type integer

subjects

The list of message subjects received. (read-only).

Type list of strings

bodies

The list of message bodies received. (read-only).

Type list of strings

class `bge.types.KX_ObjectActuator` (*SCA_IActuator*)

The object actuator (“Motion Actuator”) applies force, torque, displacement, angular displacement, velocity, or angular velocity to an object. Servo control allows to regulate force to achieve a certain speed target.

force

The force applied by the actuator.

Type list [x, y, z]

useLocalForce

A flag specifying if the force is local.

Type boolean

torque

The torque applied by the actuator.

Type list [x, y, z]

useLocalTorque

A flag specifying if the torque is local.

Type boolean

dLoc

The displacement vector applied by the actuator.

Type list [x, y, z]

useLocalDLoc

A flag specifying if the dLoc is local.

Type boolean

dRot

The angular displacement vector applied by the actuator

Type list [x, y, z]

Note: Since the displacement is applied every frame, you must adjust the displacement based on the frame rate, or you game experience will depend on the player’s computer speed.

useLocalDRot

A flag specifying if the dRot is local.

Type boolean

linV

The linear velocity applied by the actuator.

Type list [x, y, z]

useLocalLinV

A flag specifying if the linear velocity is local.

Type boolean

Note: This is the target speed for servo controllers.

angV

The angular velocity applied by the actuator.

Type list [x, y, z]

useLocalAngV

A flag specifying if the angular velocity is local.

Type boolean

damping

The damping parameter of the servo controller.

Type short

forceLimitX

The min/max force limit along the X axis and activates or deactivates the limits in the servo controller.

Type list [min(float), max(float), bool]

forceLimitY

The min/max force limit along the Y axis and activates or deactivates the limits in the servo controller.

Type list [min(float), max(float), bool]

forceLimitZ

The min/max force limit along the Z axis and activates or deactivates the limits in the servo controller.

Type list [min(float), max(float), bool]

pid

The PID coefficients of the servo controller.

Type list of floats [proportional, integral, derivate]

reference

The object that is used as reference to compute the velocity for the servo controller.

Type `KX_GameObject` or None

class `bge.types.KX_ParentActuator` (*SCA_IActuator*)

The parent actuator can set or remove an objects parent object.

object

the object this actuator sets the parent too.

Type `KX_GameObject` or None

mode

The mode of this actuator.

Type integer from 0 to 1.

compound

Whether the object shape should be added to the parent compound shape when parenting.

Effective only if the parent is already a compound shape.

Type boolean

ghost

Whether the object should be made ghost when parenting Effective only if the shape is not added to the parent compound shape.

Type boolean

class `bge.types.KX_PhysicsObjectWrapper` (*PyObjectPlus*)

`KX_PhysicsObjectWrapper`

setActive (*active*)

Set the object to be active.

Parameters *active* (*boolean*) – set to True to be active

setAngularVelocity (*x*, *y*, *z*, *local*)

Set the angular velocity of the object.

Parameters

- *x* (*float*) – angular velocity for the x-axis
- *y* (*float*) – angular velocity for the y-axis
- *z* (*float*) – angular velocity for the z-axis
- **local** (*boolean*) – set to True for local axis

setLinearVelocity (*x*, *y*, *z*, *local*)

Set the linear velocity of the object.

Parameters

- *x* (*float*) – linear velocity for the x-axis
- *y* (*float*) – linear velocity for the y-axis
- *z* (*float*) – linear velocity for the z-axis
- **local** (*boolean*) – set to True for local axis

class `bge.types.KX_PolyProxy` (*SCA_IObject*)

A polygon holds the index of the vertex forming the polygon.

Note: The polygon attributes are read-only, you need to retrieve the vertex proxy if you want to change the vertex settings.

matname

The name of polygon material, empty if no material.

Type string

material

The material of the polygon.

Type `KX_PolygonMaterial` or `KX_BlenderMaterial`

texture

The texture name of the polygon.

Type string

matid

The material index of the polygon, use this to retrieve vertex proxy from mesh proxy.

Type integer

- v1**
vertex index of the first vertex of the polygon, use this to retrieve vertex proxy from mesh proxy.
Type integer
- v2**
vertex index of the second vertex of the polygon, use this to retrieve vertex proxy from mesh proxy.
Type integer
- v3**
vertex index of the third vertex of the polygon, use this to retrieve vertex proxy from mesh proxy.
Type integer
- v4**
Vertex index of the fourth vertex of the polygon, 0 if polygon has only 3 vertex Use this to retrieve vertex proxy from mesh proxy.
Type integer
- visible**
visible state of the polygon: 1=visible, 0=invisible.
Type integer
- collide**
collide state of the polygon: 1=receives collision, 0=collision free.
Type integer
- getMaterialName ()**
Returns the polygon material name with MA prefix
Returns material name
Return type string
- getMaterial ()**
Returns The polygon material
Return type `KX_PolygonMaterial` or `KX_BlenderMaterial`
- getTextureName ()**
Returns The texture name
Return type string
- getMaterialIndex ()**
Returns the material bucket index of the polygon. This index and the ones returned by `getVertexIndex()` are needed to retrieve the vertex proxy from `MeshProxy`.
Returns the material index in the mesh
Return type integer
- getNumVertex ()**
Returns the number of vertex of the polygon.
Returns number of vertex, 3 or 4.
Return type integer
- isVisible ()**
Returns whether the polygon is visible or not

Returns 0=invisible, 1=visible

Return type boolean

isCollider ()

Returns whether the polygon is receives collision or not

Returns 0=collision free, 1=receives collision

Return type integer

getVertexIndex (*vertex*)

Returns the mesh vertex index of a polygon vertex This index and the one returned by `getMaterialIndex()` are needed to retrieve the vertex proxy from `MeshProxy`.

Parameters

- **vertex** – index of the vertex in the polygon: 0->3
- **vertex** – integer

Returns mesh vertex index

Return type integer

getMesh ()

Returns a mesh proxy

Returns mesh proxy

Return type `MeshProxy`

class `bge.types.KX_PolygonMaterial` (*PyObjectPlus*)

This is the interface to materials in the game engine.

Materials define the render state to be applied to mesh objects.

Warning: Some of the methods/variables are CObjects. If you mix these up, you will crash blender.
--

This example requires [PyOpenGL](#) and [GLEWPy](#)

```
import GameLogic
import OpenGL
from OpenGL.GL import *
from OpenGL.GLU import *
import glew
from glew import *

glewInit()

vertex_shader = """

void main(void)
{
    gl_Position = ftransform();
}
"""

fragment_shader = """

void main(void)
{
    gl_FragColor = vec4(1.0, 0.0, 0.0, 1.0);
}
```

```

}
"""

class MyMaterial:
    def __init__(self):
        self.pass_no = 0
        # Create a shader
        self.m_program = glCreateProgramObjectARB()
        # Compile the vertex shader
        self.shader(GL_VERTEX_SHADER_ARB, (vertex_shader))
        # Compile the fragment shader
        self.shader(GL_FRAGMENT_SHADER_ARB, (fragment_shader))
        # Link the shaders together
        self.link()

    def PrintInfoLog(self, tag, object):
        """
        PrintInfoLog prints the GLSL compiler log
        """
        print "Tag:      def PrintGLError(self, tag = ""):

def PrintGLError(self, tag = ""):
    """
    Prints the current GL error status
    """
    if len(tag):
        print tag
    err = glGetError()
    if err != GL_NO_ERROR:
        print "GL Error: %s\\n"%(gluErrorString(err))

def shader(self, type, shaders):
    """
    shader compiles a GLSL shader and attaches it to the current
    program.

    type should be either GL_VERTEX_SHADER_ARB or GL_FRAGMENT_SHADER_ARB
    shaders should be a sequence of shader source to compile.
    """
    # Create a shader object
    shader_object = glCreateShaderObjectARB(type)

    # Add the source code
    glShaderSourceARB(shader_object, len(shaders), shaders)

    # Compile the shader
    glCompileShaderARB(shader_object)

    # Print the compiler log
    self.PrintInfoLog("vertex shader", shader_object)

    # Check if compiled, and attach if it did
    compiled = glGetObjectParameterivARB(shader_object, GL_OBJECT_COMPILE_STATUS_ARB)
    if compiled:
        glAttachObjectARB(self.m_program, shader_object)

    # Delete the object (glAttachObjectARB makes a copy)
    glDeleteObjectARB(shader_object)

```

```
# print the gl error log
self.PrintGLError()

def link(self):
    """
    Links the shaders together.
    """
    # clear error indicator
    glGetError()

    glLinkProgramARB(self.m_program)

    self.PrintInfoLog("link", self.m_program)

    linked = glGetObjectParameterivARB(self.m_program, GL_OBJECT_LINK_STATUS_ARB)
    if not linked:
        print "Shader failed to link"
        return

    glValidateProgramARB(self.m_program)
    valid = glGetObjectParameterivARB(self.m_program, GL_OBJECT_VALIDATE_STATUS_ARB)
    if not valid:
        print "Shader failed to validate"
        return

def activate(self, rasty, cachingInfo, mat):
    self.pass_no+=1
    if (self.pass_no == 1):
        glDisable(GL_COLOR_MATERIAL)
        glUseProgramObjectARB(self.m_program)
        return True

    glEnable(GL_COLOR_MATERIAL)
    glUseProgramObjectARB(0)
    self.pass_no = 0
    return False

obj = GameLogic.getCurrentController().owner

mesh = obj.meshes[0]

for mat in mesh.materials:
    mat.setCustomMaterial(MyMaterial())
    print mat.texture
```

texture

Texture name.

Type string (read-only)**gl_texture**

OpenGL texture handle (eg for glBindTexture(GL_TEXTURE_2D, gl_texture).

Type integer (read-only)**material**

Material name.

Type string (read-only)

tface

Texture face properties.

Type CObject (read-only)

tile

Texture is tiling.

Type boolean

tilexrep

Number of tile repetitions in x direction.

Type integer

tileyrep

Number of tile repetitions in y direction.

Type integer

drawingmode

Drawing mode for the material. - 2 (drawingmode & 4) Textured - 4 (drawingmode & 16) Light - 14 (drawingmode & 16384) 3d Polygon Text.

Type bitfield

transparent

This material is transparent. All meshes with this material will be rendered after non transparent meshes from back to front.

Type boolean

zsort

Transparent polygons in meshes with this material will be sorted back to front before rendering. Non-Transparent polygons will be sorted front to back before rendering.

Type boolean

lightlayer

Light layers this material affects.

Type bitfield.

triangle

Mesh data with this material is triangles. It's probably not safe to change this.

Type boolean

diffuse

The diffuse colour of the material. black = [0.0, 0.0, 0.0] white = [1.0, 1.0, 1.0].

Type list [r, g, b]

specular

The specular colour of the material. black = [0.0, 0.0, 0.0] white = [1.0, 1.0, 1.0].

Type list [r, g, b]

shininess

The shininess (specular exponent) of the material. $0.0 \leq \text{shininess} \leq 128.0$.

Type float

specularity

The amount of specular of the material. $0.0 \leq \text{specularity} \leq 1.0$.

Type float

updateTexture (*tface, rasty*)

Updates a realtime animation.

Parameters

- **tface** (*CObject*) – Texture face (eg mat.tface)
- **rasty** (*CObject*) – Rasterizer

setTexture (*tface*)

Sets texture render state.

Parameters **tface** (*CObject*) – Texture face

```
mat.setTexture(mat.tface)
```

activate (*rasty, cachingInfo*)

Sets material parameters for this object for rendering.

Material Parameters set:

- 1.Texture
- 2.Backface culling
- 3.Line drawing
- 4.Specular Colour
- 5.Shininess
- 6.Diffuse Colour
- 7.Polygon Offset.

Parameters

- **rasty** (*CObject*) – Rasterizer instance.
- **cachingInfo** (*CObject*) – Material cache instance.

setCustomMaterial (*material*)

Sets the material state setup object.

Using this method, you can extend or completely replace the gameengine material to do your own advanced multipass effects.

Use this method to register your material class. Instead of the normal material, your class's activate method will be called just before rendering the mesh. This should setup the texture, material, and any other state you would like. It should return True to render the mesh, or False if you are finished. You should clean up any state Blender does not set before returning False.

Activate Method Definition:

```
def activate(self, rasty, cachingInfo, material):
```

Parameters **material** (*instance*) – The material object.

```
class PyMaterial:  
    def __init__(self):  
        self.pass_no = -1
```



```

def activate(self, rasty, cachingInfo, material):
    # Activate the material here.
    #
    # The activate method will be called until it returns False.
    # Every time the activate method returns True the mesh will
    # be rendered.
    #
    # rasty is a CObject for passing to material.updateTexture()
    #     and material.activate()
    # cachingInfo is a CObject for passing to material.activate()
    # material is the KX_PolygonMaterial instance this material
    #     was added to

    # default material properties:
    self.pass_no += 1
    if self.pass_no == 0:
        material.activate(rasty, cachingInfo)
        # Return True to do this pass
        return True

    # clean up and return False to finish.
    self.pass_no = -1
    return False

# Create a new Python Material and pass it to the renderer.
mat.setCustomMaterial(PyMaterial())

```

class `bge.types.KX_RadarSensor` (*KX_NearSensor*)

Radar sensor is a near sensor with a conical sensor object.

coneOrigin

The origin of the cone with which to test. The origin is in the middle of the cone. (read-only).

Type list of floats [x, y, z]

coneTarget

The center of the bottom face of the cone with which to test. (read-only).

Type list of floats [x, y, z]

distance

The height of the cone with which to test.

Type float

angle

The angle of the cone (in degrees) with which to test.

Type float from 0 to 360

axis

The axis on which the radar cone is cast.

Type integer from 0 to 5

`KX_RADAR_AXIS_POS_X`, `KX_RADAR_AXIS_POS_Y`, `KX_RADAR_AXIS_POS_Z`,
`KX_RADAR_AXIS_NEG_X`, `KX_RADAR_AXIS_NEG_Y`, `KX_RADAR_AXIS_NEG_Z`

getConeHeight ()

Returns The height of the cone with which to test.

Return type float

class `bge.types.KX_RaySensor` (*SCA_ISensor*)

A ray sensor detects the first object in a given direction.

propName

The property the ray is looking for.

Type string

range

The distance of the ray.

Type float

useMaterial

Whether or not to look for a material (false = property).

Type boolean

useXRay

Whether or not to use XRay.

Type boolean

hitObject

The game object that was hit by the ray. (read-only).

Type `KX_GameObject`

hitPosition

The position (in worldcoordinates) where the object was hit by the ray. (read-only).

Type list [x, y, z]

hitNormal

The normal (in worldcoordinates) of the object at the location where the object was hit by the ray. (read-only).

Type list [x, y, z]

rayDirection

The direction from the ray (in worldcoordinates). (read-only).

Type list [x, y, z]

axis

The axis the ray is pointing on.

Type integer from 0 to 5

•KX_RAY_AXIS_POS_X

•KX_RAY_AXIS_POS_Y

•KX_RAY_AXIS_POS_Z

•KX_RAY_AXIS_NEG_X

•KX_RAY_AXIS_NEG_Y

•KX_RAY_AXIS_NEG_Z

class `bge.types.KX_SCA_AddObjectActuator` (*SCA_IActuator*)

Edit Object Actuator (in Add Object Mode)

Warning: An Add Object actuator will be ignored if at game start, the linked object doesn't exist (or is empty) or the linked object is in an active layer.

Error: GameObject 'Name' has a AddObjectActuator 'ActuatorName' without object (in 'nonactive'

object

the object this actuator adds.

Type `KX_GameObject` or `None`

objectLastCreated

the last added object from this actuator (read-only).

Type `KX_GameObject` or `None`

time

the lifetime of added objects, in frames. Set to 0 to disable automatic deletion.

Type `integer`

linearVelocity

the initial linear velocity of added objects.

Type `list [vx, vy, vz]`

angularVelocity

the initial angular velocity of added objects.

Type `list [vx, vy, vz]`

instantAddObject ()

adds the object without needing to calling `SCA_PythonController.activate()`

Note: Use `objectLastCreated` to get the newly created object.

class `bge.types.KX_SCA_DynamicActuator` (*SCA_IActuator*)

Dynamic Actuator.

mode

Type `integer`

the type of operation of the actuator, 0-4

- `KX_DYN_RESTORE_DYNAMICS(0)`
- `KX_DYN_DISABLE_DYNAMICS(1)`
- `KX_DYN_ENABLE_RIGID_BODY(2)`
- `KX_DYN_DISABLE_RIGID_BODY(3)`
- `KX_DYN_SET_MASS(4)`

mass

the mass value for the `KX_DYN_SET_MASS` operation.

Type `float`

class `bge.types.KX_SCA_EndObjectActuator` (*SCA_IActuator*)

Edit Object Actuator (in End Object mode)

This actuator has no python methods.

`class bge.types.KX_SCA_ReplaceMeshActuator (SCA_IActuator)`

Edit Object actuator, in Replace Mesh mode.

Warning: Replace mesh actuators will be ignored if at game start, the named mesh doesn't exist. This will generate a warning in the console

```
Error: GameObject 'Name' ReplaceMeshActuator 'ActuatorName' without object
```

```
# Level-of-detail
# Switch a game object's mesh based on its depth in the camera view.
# +-----+ +-----+ +-----+
# | Always +-----+ Python +-----+ Edit Object (Replace Mesh) LOD.Mesh |
# +-----+ +-----+ +-----+
import GameLogic

# List detail meshes here
# Mesh (name, near, far)
# Meshes overlap so that they don't 'pop' when on the edge of the distance.
meshes = (("Hi", 0.0, -20.0),
          ("Med", -15.0, -50.0),
          ("Lo", -40.0, -100.0)
         )

co = GameLogic.getCurrentController()
obj = co.owner
act = co.actuators["LOD." + obj.name]
cam = GameLogic.getCurrentScene().active_camera

def Depth(pos, plane):
    return pos[0]*plane[0] + pos[1]*plane[1] + pos[2]*plane[2] + plane[3]

# Depth is negative and decreasing further from the camera
depth = Depth(obj.position, cam.world_to_camera[2])

newmesh = None
curmesh = None
# Find the lowest detail mesh for depth
for mesh in meshes:
    if depth < mesh[1] and depth > mesh[2]:
        newmesh = mesh
    if "ME" + obj.name + mesh[0] == act.getMesh():
        curmesh = mesh

if newmesh != None and "ME" + obj.name + newmesh[0] != act.getMesh():
    # The mesh is a different mesh - switch it.
    # Check the current mesh is not a better fit.
    if curmesh == None or curmesh[1] < depth or curmesh[2] > depth:
        act.mesh = obj.getName() + newmesh[0]
        GameLogic.addActiveActuator(act, True)
```

mesh

MeshProxy or the name of the mesh that will replace the current one.

Set to None to disable actuator.

Type MeshProxy or None if no mesh is set

useDisplayMesh

when true the displayed mesh is replaced.

Type boolean

usePhysicsMesh

when true the physics mesh is replaced.

Type boolean

instantReplaceMesh()

Immediately replace mesh without delay.

class `bge.types.KX_Scene` (*PyObjectPlus*)

An active scene that gives access to objects, cameras, lights and scene attributes.

The activity culling stuff is supposed to disable logic bricks when their owner gets too far from the active camera. It was taken from some code lurking at the back of `KX_Scene` - who knows what it does!

```
import GameLogic

# get the scene
scene = GameLogic.getCurrentScene()

# print all the objects in the scene
for obj in scene.objects:
    print obj.name

# get an object named 'Cube'
obj = scene.objects["Cube"]

# get the first object in the scene.
obj = scene.objects[0]

# Get the depth of an object in the camera view.
import GameLogic

obj = GameLogic.getCurrentController().owner
cam = GameLogic.getCurrentScene().active_camera

# Depth is negative and decreasing further from the camera
depth = obj.position[0]*cam.world_to_camera[2][0] + obj.position[1]*cam.world_to_camera[2][1] +
```

@bug: All attributes are read only at the moment.

name

The scene's name, (read-only).

Type string

objects

A list of objects in the scene, (read-only).

Type `CListValue` of `KX_GameObject`

objectsInactive

A list of objects on background layers (used for the `addObject` actuator), (read-only).

Type `CListValue` of `KX_GameObject`

lights

A list of lights in the scene, (read-only).

Type `CListValue` of `KX_LightObject`

cameras

A list of cameras in the scene, (read-only).

Type `CListValue` of `KX_Camera`

active_camera

The current active camera.

Type `KX_Camera`

Note: This can be set directly from python to avoid using the `KX_SceneActuator`.

suspended

True if the scene is suspended, (read-only).

Type `boolean`

activity_culling

True if the scene is activity culling.

Type `boolean`

activity_culling_radius

The distance outside which to do activity culling. Measured in manhattan distance.

Type `float`

dbvt_culling

True when Dynamic Bounding box Volume Tree is set (read-only).

Type `boolean`

pre_draw

A list of callables to be run before the render step.

Type `list`

post_draw

A list of callables to be run after the render step.

Type `list`

addObject (*object, other, time=0*)

Adds an object to the scene like the Add Object Actuator would.

Parameters

- **object** (`KX_GameObject` or string) – The object to add
- **other** (`KX_GameObject` or string) – The object's center to use when adding the object
- **time** (*integer*) – The lifetime of the added object, in frames. A time of 0 means the object will last forever.

Returns The newly added object.

Return type `KX_GameObject`

end()

Removes the scene from the game.

restart()

Restarts the scene.

replace (*scene*)

Replaces this scene with another one.

Parameters **scene** (*string*) – The name of the scene to replace this scene with.

suspend ()

Suspends this scene.

resume ()

Resume this scene.

get (*key*, *default=None*)

Return the value matching key, or the default value if its not found. :return: The key value or a default.

class `bge.types.KX_SceneActuator` (*SCA_IActuator*)

Scene Actuator logic brick.

Warning: Scene actuators that use a scene name will be ignored if at game start, the named scene doesn't exist or is empty
This will generate a warning in the console:

```
Error: GameObject 'Name' has a SceneActuator 'ActuatorName' (SetScene) without scene
```

scene

the name of the scene to change to/overlay/underlay/remove/suspend/resume.

Type string

camera

the camera to change to.

Type `KX_Camera` on read, string or `KX_Camera` on write

Note: When setting the attribute, you can use either a `KX_Camera` or the name of the camera.

useRestart

Set flag to True to restart the sene.

Type boolean

mode

The mode of the actuator.

Type integer from 0 to 5.

class `bge.types.KX_SoundActuator` (*SCA_IActuator*)

Sound Actuator.

The `startSound`, `pauseSound` and `stopSound` do not require the actuator to be activated - they act instantly provided that the actuator has been activated once at least.

fileName

The filename of the sound this actuator plays.

Type string

volume

The volume (gain) of the sound.

Type float

pitch

The pitch of the sound.

Type float

rolloffFactor

The roll off factor. Rolloff defines the rate of attenuation as the sound gets further away.

Type float

looping

The loop mode of the actuator.

Type integer

position

The position of the sound as a list: [x, y, z].

Type float array

velocity

The velocity of the emitter as a list: [x, y, z]. The relative velocity to the observer determines the pitch.
List of 3 floats: [x, y, z].

Type float array

orientation

The orientation of the sound. When setting the orientation you can also use quaternion [float, float, float, float] or euler angles [float, float, float].

Type 3x3 matrix [[float]]

mode

The operation mode of the actuator. Can be one of *these constants*

Type integer

class `bge.types.KX_StateActuator` (*SCA_IActuator*)

State actuator changes the state mask of parent object.

operation

Type of bit operation to be applied on object state mask.

You can use one of *these constants*

Type integer

mask

Value that defines the bits that will be modified by the operation.

The bits that are 1 in the mask will be updated in the object state.

The bits that are 0 are will be left unmodified expect for the Copy operation which copies the mask to the object state.

Type integer

class `bge.types.KX_TrackToActuator` (*SCA_IActuator*)

Edit Object actuator in Track To mode.

Warning: Track To Actuators will be ignored if at game start, the object to track to is invalid.
This will generate a warning in the console:

```
GameObject 'Name' no object in EditObjectActuator 'ActuatorName'
```


object

the object this actuator tracks.

Type `KX_GameObject` or `None`

time

the time in frames with which to delay the tracking motion.

Type `integer`

use3D

the tracking motion to use 3D.

Type `boolean`

class `bge.types.KX_VehicleWrapper` (*PyObjectPlus*)

`KX_VehicleWrapper`

TODO - description

addWheel (*wheel, attachPos, attachDir, axleDir, suspensionRestLength, wheelRadius, hasSteering*)

Add a wheel to the vehicle

Parameters

- **wheel** (`KX_GameObject` or a `KX_GameObject` name) – The object to use as a wheel.
- **attachPos** (*vector of 3 floats*) – The position that this wheel will attach to.
- **attachDir** (*vector of 3 floats*) – The direction this wheel points.
- **axleDir** (*vector of 3 floats*) – The direction of this wheels axle.
- **suspensionRestLength** (*float*) – TODO - Description
- **wheelRadius** (*float*) – The size of the wheel.

applyBraking (*force, wheelIndex*)

Apply a braking force to the specified wheel

Parameters

- **force** (*float*) – the brake force
- **wheelIndex** (*integer*) – index of the wheel where the force needs to be applied

applyEngineForce (*force, wheelIndex*)

Apply an engine force to the specified wheel

Parameters

- **force** (*float*) – the engine force
- **wheelIndex** (*integer*) – index of the wheel where the force needs to be applied

getConstraintId ()

Get the constraint ID

Returns the constraint id

Return type `integer`

getConstraintType ()

Returns the constraint type.

Returns constraint type

Return type integer

getNumWheels ()

Returns the number of wheels.

Returns the number of wheels for this vehicle

Return type integer

getWheelOrientationQuaternion (*wheelIndex*)

Returns the wheel orientation as a quaternion.

Parameters **wheelIndex** (*integer*) – the wheel index

Returns TODO Description

Return type TODO - type should be quat as per method name but from the code it looks like a matrix

getWheelPosition (*wheelIndex*)

Returns the position of the specified wheel

Parameters **wheelIndex** (*integer*) – the wheel index

Returns position vector

Return type list[x, y, z]

getWheelRotation (*wheelIndex*)

Returns the rotation of the specified wheel

Parameters **wheelIndex** (*integer*) – the wheel index

Returns the wheel rotation

Return type float

setRollInfluence (*rollInfluence*, *wheelIndex*)

Set the specified wheel's roll influence. The higher the roll influence the more the vehicle will tend to roll over in corners.

Parameters

- **rollInfluence** (*float*) – the wheel roll influence
- **wheelIndex** (*integer*) – the wheel index

setSteeringValue (*steering*, *wheelIndex*)

Set the specified wheel's steering

Parameters

- **steering** (*float*) – the wheel steering
- **wheelIndex** (*integer*) – the wheel index

setSuspensionCompression (*compression*, *wheelIndex*)

Set the specified wheel's compression

Parameters

- **compression** (*float*) – the wheel compression
- **wheelIndex** (*integer*) – the wheel index

setSuspensionDamping (*damping*, *wheelIndex*)

Set the specified wheel's damping

Parameters

- **damping** (*float*) – the wheel damping
- **wheelIndex** (*integer*) – the wheel index

setSuspensionStiffness (*stiffness, wheelIndex*)

Set the specified wheel's stiffness

Parameters

- **stiffness** (*float*) – the wheel stiffness
- **wheelIndex** (*integer*) – the wheel index

setTyreFriction (*friction, wheelIndex*)

Set the specified wheel's tyre friction

Parameters

- **friction** (*float*) – the tyre friction
- **wheelIndex** (*integer*) – the wheel index

class `bge.types.KX_VertexProxy` (*SCA_IObject*)

A vertex holds position, UV, colour and normal information.

Note: The physics simulation is NOT currently updated - physics will not respond to changes in the vertex position.

XYZ

The position of the vertex.

Type list [x, y, z]

UV

The texture coordinates of the vertex.

Type list [u, v]

normal

The normal of the vertex.

Type list [nx, ny, nz]

colour

The colour of the vertex.

Type list [r, g, b, a]

Black = [0.0, 0.0, 0.0, 1.0], White = [1.0, 1.0, 1.0, 1.0]

color

Synonym for colour.

x

The x coordinate of the vertex.

Type float

y

The y coordinate of the vertex.

Type float

z

The z coordinate of the vertex.

Type float

u

The u texture coordinate of the vertex.

Type float

v

The v texture coordinate of the vertex.

Type float

u2

The second u texture coordinate of the vertex.

Type float

v2

The second v texture coordinate of the vertex.

Type float

r

The red component of the vertex colour. $0.0 \leq r \leq 1.0$.

Type float

g

The green component of the vertex colour. $0.0 \leq g \leq 1.0$.

Type float

b

The blue component of the vertex colour. $0.0 \leq b \leq 1.0$.

Type float

a

The alpha component of the vertex colour. $0.0 \leq a \leq 1.0$.

Type float

getXYZ ()

Gets the position of this vertex.

Returns this vertexes position in local coordinates.

Return type list [x, y, z]

setXYZ (pos)

Sets the position of this vertex.

Type list [x, y, z]

Parameters **pos** – the new position for this vertex in local coordinates.

getUV ()

Gets the UV (texture) coordinates of this vertex.

Returns this vertexes UV (texture) coordinates.

Return type list [u, v]

setUV (uv)

Sets the UV (texture) coordinates of this vertex.

Type list [u, v]

getUV2 ()

Gets the 2nd UV (texture) coordinates of this vertex.

Returns this vertexes UV (texture) coordinates.

Return type list [u, v]

setUV2 (uv, unit)

Sets the 2nd UV (texture) coordinates of this vertex.

Type list [u, v]

Parameters

- **unit** – optional argument, FLAT==1, SECOND_UV==2, defaults to SECOND_UV
- **unit** – integer

getRGBA ()

Gets the colour of this vertex.

The colour is represented as four bytes packed into an integer value. The colour is packed as RGBA.

Since Python offers no way to get each byte without shifting, you must use the struct module to access colour in a machine independent way.

Because of this, it is suggested you use the r, g, b and a attributes or the colour attribute instead.

```
import struct;
col = struct.unpack('4B', struct.pack('I', v.getRGBA()))
# col = (r, g, b, a)
# black = ( 0, 0, 0, 255)
# white = (255, 255, 255, 255)
```

Returns packed colour. 4 byte integer with one byte per colour channel in RGBA format.

Return type integer

setRGBA (col)

Sets the colour of this vertex.

See getRGBA() for the format of col, and its relevant problems. Use the r, g, b and a attributes or the colour attribute instead.

setRGBA() also accepts a four component list as argument col. The list represents the colour as [r, g, b, a] with black = [0.0, 0.0, 0.0, 1.0] and white = [1.0, 1.0, 1.0, 1.0]

```
v.setRGBA(0xff0000ff) # Red
v.setRGBA(0xff00ff00) # Green on little endian, transparent purple on big endian
v.setRGBA([1.0, 0.0, 0.0, 1.0]) # Red
v.setRGBA([0.0, 1.0, 0.0, 1.0]) # Green on all platforms.
```

Parameters **col** (*integer or list [r, g, b, a]*) – the new colour of this vertex in packed RGBA format.

getNormal ()

Gets the normal vector of this vertex.

Returns normalised normal vector.

Return type list [nx, ny, nz]

setNormal (*normal*)

Sets the normal vector of this vertex.

Type sequence of floats [r, g, b]

Parameters **normal** – the new normal of this vertex.

class `bge.types.KX_VisibilityActuator` (*SCA_IActuator*)

Visibility Actuator.

visibility

whether the actuator makes its parent object visible or invisible.

Type boolean

useOcclusion

whether the actuator makes its parent object an occluder or not.

Type boolean

useRecursion

whether the visibility/occlusion should be propagated to all children of the object.

Type boolean

class `bge.types.SCA_2DFilterActuator` (*SCA_IActuator*)

Create, enable and disable 2D filters

The following properties don't have an immediate effect. You must activate the actuator to get the result. The actuator is not persistent: it automatically stops itself after setting up the filter but the filter remains active. To stop a filter you must activate the actuator with 'type' set to [RAS_2DFILTER_DISABLED](#) or [RAS_2DFILTER_NOFILTER](#).

shaderText

shader source code for custom shader.

Type string

disableMotionBlur

action on motion blur: 0=enable, 1=disable.

Type integer

mode

Type of 2D filter, use one of *these constants*

Type integer

passNumber

order number of filter in the stack of 2D filters. Filters are executed in increasing order of passNb.

Only be one filter can be defined per passNb.

Type integer (0-100)

value

argument for motion blur filter.

Type float (0.0-100.0)

class `bge.types.SCA_ANDController` (*SCA_IController*)

An AND controller activates only when all linked sensors are activated.

There are no special python methods for this controller.

class `bge.types.SCA_ActuatorSensor` (*SCA_ISensor*)

Actuator sensor detect change in actuator state of the parent object. It generates a positive pulse if the corresponding actuator is activated and a negative pulse if the actuator is deactivated.

actuator

the name of the actuator that the sensor is monitoring.

Type string

class `bge.types.SCA_AlwaysSensor` (*SCA_ISensor*)

This sensor is always activated.

class `bge.types.SCA_DelaySensor` (*SCA_ISensor*)

The Delay sensor generates positive and negative triggers at precise time, expressed in number of frames. The delay parameter defines the length of the initial OFF period. A positive trigger is generated at the end of this period.

The duration parameter defines the length of the ON period following the OFF period. There is a negative trigger at the end of the ON period. If duration is 0, the sensor stays ON and there is no negative trigger.

The sensor runs the OFF-ON cycle once unless the repeat option is set: the OFF-ON cycle repeats indefinitely (or the OFF cycle if duration is 0).

Use `SCA_ISensor.reset` at any time to restart sensor.

delay

length of the initial OFF period as number of frame, 0 for immediate trigger.

Type integer.

duration

length of the ON period in number of frame after the initial OFF period.

If duration is greater than 0, a negative trigger is sent at the end of the ON pulse.

Type integer

repeat

1 if the OFF-ON cycle should be repeated indefinitely, 0 if it should run once.

Type integer

class `bge.types.SCA_JoystickSensor` (*SCA_ISensor*)

This sensor detects player joystick events.

axisValues

The state of the joysticks axis as a list of values `numAxis` long. (read-only).

Type list of ints.

Each specifying the value of an axis between -32767 and 32767 depending on how far the axis is pushed, 0 for nothing. The first 2 values are used by most joysticks and gamepads for directional control. 3rd and 4th values are only on some joysticks and can be used for arbitrary controls.

•left:[-32767, 0, ...]

•right:[32767, 0, ...]

•up:[0, -32767, ...]

•down:[0, 32767, ...]

axisSingle

like `axisValues` but returns a single axis value that is set by the sensor. (read-only).

Type integer

Note: Only use this for “Single Axis” type sensors otherwise it will raise an error.

hatValues

The state of the joysticks hats as a list of values `numHats` long. (read-only).

Type list of ints

Each specifying the direction of the hat from 1 to 12, 0 when inactive.

Hat directions are as follows...

- 0:None
- 1:Up
- 2:Right
- 4:Down
- 8:Left
- 3:Up - Right
- 6:Down - Right
- 12:Down - Left
- 9:Up - Left

hatSingle

Like `hatValues` but returns a single hat direction value that is set by the sensor. (read-only).

Type integer

numAxis

The number of axes for the joystick at this index. (read-only).

Type integer

numButtons

The number of buttons for the joystick at this index. (read-only).

Type integer

numHats

The number of hats for the joystick at this index. (read-only).

Type integer

connected

True if a joystick is connected at this joysticks index. (read-only).

Type boolean

index

The joystick index to use (from 0 to 7). The first joystick is always 0.

Type integer

threshold

Axis threshold. Joystick axis motion below this threshold wont trigger an event. Use values between (0 and 32767), lower values are more sensitive.

Type integer

button

The button index the sensor reacts to (first button = 0). When the “All Events” toggle is set, this option has no effect.

Type integer

axis

The axis this sensor reacts to, as a list of two values [axisIndex, axisDirection]

- axisIndex: the axis index to use when detecting axis movement, 1=primary directional control, 2=secondary directional control.
- axisDirection: 0=right, 1=up, 2=left, 3=down.

Type [integer, integer]

hat

The hat the sensor reacts to, as a list of two values: [hatIndex, hatDirection]

- hatIndex: the hat index to use when detecting hat movement, 1=primary hat, 2=secondary hat (4 max).
- hatDirection: 1-12.

Type [integer, integer]

getButtonActiveList ()

Returns A list containing the indices of the currently pressed buttons.

Return type list

getButtonStatus (*buttonIndex*)

Parameters **buttonIndex** (*integer*) – the button index, 0=first button

Returns The current pressed state of the specified button.

Return type boolean

class `bge.types.SCA_KeyboardSensor` (*SCA_ISensor*)

A keyboard sensor detects player key presses.

See module `bge.keys` for keycode values.

key

The key code this sensor is looking for.

Type keycode from `bge.keys` module

hold1

The key code for the first modifier this sensor is looking for.

Type keycode from `bge.keys` module

hold2

The key code for the second modifier this sensor is looking for.

Type keycode from `bge.keys` module

toggleProperty

The name of the property that indicates whether or not to log keystrokes as a string.

Type string

targetProperty

The name of the property that receives keystrokes in case in case a string is logged.

Type string

useAllKeys

Flag to determine whether or not to accept all keys.

Type boolean

events

a list of pressed keys that have either been pressed, or just released, or are active this frame. (read-only).

Type list *[[keycode, status], ...]*

getKeyStatus (*keycode*)

Get the status of a key.

Parameters **keycode** (*integer*) – The code that represents the key you want to get the state of, use one of *these constants*

Returns The state of the given key, can be one of *these constants*

Return type int

class `bge.types.SCA_NANDController` (*SCA_IController*)

An NAND controller activates when all linked sensors are not active.

There are no special python methods for this controller.

class `bge.types.SCA_NORController` (*SCA_IController*)

An NOR controller activates only when all linked sensors are de-activated.

There are no special python methods for this controller.

class `bge.types.SCA_ORController` (*SCA_IController*)

An OR controller activates when any connected sensor activates.

There are no special python methods for this controller.

class `bge.types.SCA_PropertyActuator` (*SCA_IActuator*)

Property Actuator

propName

the property on which to operate.

Type string

value

the value with which the actuator operates.

Type string

mode

TODO - add constants to game logic dict!.

Type integer

class `bge.types.SCA_PropertySensor` (*SCA_ISensor*)

Activates when the game object property matches.

mode

Type of check on the property. Can be one of *these constants*

Type integer.

propName

the property the sensor operates.

Type string

value

the value with which the sensor compares to the value of the property.

Type string

min

the minimum value of the range used to evaluate the property when in interval mode.

Type string

max

the maximum value of the range used to evaluate the property when in interval mode.

Type string

class `bge.types.SCA_PythonController` (*SCA_IController*)

A Python controller uses a Python script to activate it's actuators, based on it's sensors.

script

The value of this variable depends on the execution method.

- When 'Script' execution mode is set this value contains the entire python script as a single string (not the script name as you might expect) which can be modified to run different scripts.
- When 'Module' execution mode is set this value will contain a single line string - module name and function "module.func" or "package.module.func" where the module names are python textblocks or external scripts.

Type string

Note: Once this is set the script name given for warnings will remain unchanged.

mode

the execution mode for this controller (read-only).

- Script: 0, Execute the `script` as a python code.
- Module: 1, Execute the `script` as a module and function.

Type integer

activate (*actuator*)

Activates an actuator attached to this controller.

Parameters `actuator` (*actuator or the actuator name as a string*) – The actuator to operate on.

deactivate (*actuator*)

Deactivates an actuator attached to this controller.

Parameters `actuator` (*actuator or the actuator name as a string*) – The actuator to operate on.

class `bge.types.SCA_RandomActuator` (*SCA_IActuator*)

Random Actuator

seed

Seed of the random number generator.

Type integer.

Equal seeds produce equal series. If the seed is 0, the generator will produce the same value on every call.

para1

the first parameter of the active distribution.

Type float, read-only.

Refer to the documentation of the generator types for the meaning of this value.

para2

the second parameter of the active distribution.

Type float, read-only

Refer to the documentation of the generator types for the meaning of this value.

distribution

Distribution type. (read-only). Can be one of *these constants*

Type integer

propName

the name of the property to set with the random value.

Type string

If the generator and property types do not match, the assignment is ignored.

setBoolConst (*value*)

Sets this generator to produce a constant boolean value.

Parameters **value** (*boolean*) – The value to return.

setBoolUniform ()

Sets this generator to produce a uniform boolean distribution.

The generator will generate True or False with 50% chance.

setBoolBernouilli (*value*)

Sets this generator to produce a Bernouilli distribution.

Parameters **value** (*float*) – Specifies the proportion of False values to produce.

- 0.0: Always generate True
- 1.0: Always generate False

setIntConst (*value*)

Sets this generator to always produce the given value.

Parameters **value** (*integer*) – the value this generator produces.

setIntUniform (*lower_bound*, *upper_bound*)

Sets this generator to produce a random value between the given lower and upper bounds (inclusive).

setIntPoisson (*value*)

Generate a Poisson-distributed number.

This performs a series of Bernouilli tests with parameter value. It returns the number of tries needed to achieve succes.

setFloatConst (*value*)

Always generate the given value.

setFloatUniform (*lower_bound, upper_bound*)

Generates a random float between *lower_bound* and *upper_bound* with a uniform distribution.

setFloatNormal (*mean, standard_deviation*)

Generates a random float from the given normal distribution.

Parameters

- **mean** (*float*) – The mean (average) value of the generated numbers
- **standard_deviation** (*float*) – The standard deviation of the generated numbers.

setFloatNegativeExponential (*half_life*)

Generate negative-exponentially distributed numbers.

The half-life ‘time’ is characterized by *half_life*.

class `bge.types.SCA_RandomSensor` (*SCA_ISensor*)

This sensor activates randomly.

lastDraw

The seed of the random number generator.

Type integer

seed

The seed of the random number generator.

Type integer

setSeed (*seed*)

Sets the seed of the random number generator.

If the seed is 0, the generator will produce the same value on every call.

getSeed ()

Returns The initial seed of the generator. Equal seeds produce equal random series.

Return type integer

getLastDraw ()

Returns The last random number generated.

Return type integer

class `bge.types.SCA_XNORController` (*SCA_IController*)

An XNOR controller activates when all linked sensors are the same (activated or inactive).

There are no special python methods for this controller.

class `bge.types.SCA_XORController` (*SCA_IController*)

An XOR controller activates when there is the input is mixed, but not when all are on or off.

There are no special python methods for this controller.

class `bge.types.KX_Camera` (*KX_GameObject*)

A Camera object.

INSIDE

See `sphereInsideFrustum` and `boxInsideFrustum`

INTERSECT

See `sphereInsideFrustum` and `boxInsideFrustum`

OUTSIDE

See `sphereInsideFrustum` and `boxInsideFrustum`

lens

The camera's lens value.

Type float

ortho_scale

The camera's view scale when in orthographic mode.

Type float

near

The camera's near clip distance.

Type float

far

The camera's far clip distance.

Type float

perspective

True if this camera has a perspective transform, False for an orthographic projection.

Type boolean

frustum_culling

True if this camera is frustum culling.

Type boolean

projection_matrix

This camera's 4x4 projection matrix.

Type 4x4 Matrix [[float]]

modelview_matrix

This camera's 4x4 model view matrix. (read-only).

Type 4x4 Matrix [[float]]

Note: This matrix is regenerated every frame from the camera's position and orientation.

camera_to_world

This camera's camera to world transform. (read-only).

Type 4x4 Matrix [[float]]

Note: This matrix is regenerated every frame from the camera's position and orientation.

world_to_camera

This camera's world to camera transform. (read-only).

Type 4x4 Matrix [[float]]

Note: Regenerated every frame from the camera's position and orientation.

Note: This is camera_to_world inverted.

useViewport

True when the camera is used as a viewport, set True to enable a viewport for this camera.

Type boolean

sphereInsideFrustum (*centre, radius*)

Tests the given sphere against the view frustum.

Parameters

- **centre** (*list [x, y, z]*) – The centre of the sphere (in world coordinates.)
- **radius** (*float*) – the radius of the sphere

Returns `INSIDE`, `OUTSIDE` or `INTERSECT`

Return type integer

Note: When the camera is first initialized the result will be invalid because the projection matrix has not been set.

```
import GameLogic
co = GameLogic.getCurrentController()
cam = co.owner

# A sphere of radius 4.0 located at [x, y, z] = [1.0, 1.0, 1.0]
if (cam.sphereInsideFrustum([1.0, 1.0, 1.0], 4) != cam.OUTSIDE):
    # Sphere is inside frustum !
    # Do something useful !
else:
    # Sphere is outside frustum
```

boxInsideFrustum (*box*)

Tests the given box against the view frustum.

Parameters **box** (*list of lists*) – Eight (8) corner points of the box (in world coordinates.)

Returns `INSIDE`, `OUTSIDE` or `INTERSECT`

Note: When the camera is first initialized the result will be invalid because the projection matrix has not been set.

```
import GameLogic
co = GameLogic.getCurrentController()
cam = co.owner

# Box to test...
box = []
```

```
box.append([-1.0, -1.0, -1.0])
box.append([-1.0, -1.0, 1.0])
box.append([-1.0, 1.0, -1.0])
box.append([-1.0, 1.0, 1.0])
box.append([ 1.0, -1.0, -1.0])
box.append([ 1.0, -1.0, 1.0])
box.append([ 1.0, 1.0, -1.0])
box.append([ 1.0, 1.0, 1.0])

if (cam.boxInsideFrustum(box) != cam.OUTSIDE):
    # Box is inside/intersects frustum !
    # Do something useful !
else:
    # Box is outside the frustum !
```

pointInsideFrustum (*point*)

Tests the given point against the view frustum.

Parameters **point** (*3D Vector*) – The point to test (in world coordinates.)

Returns True if the given point is inside this camera's viewing frustum.

Return type boolean

Note: When the camera is first initialized the result will be invalid because the projection matrix has not been set.

```
import GameLogic
co = GameLogic.getCurrentController()
cam = co.owner

# Test point [0.0, 0.0, 0.0]
if (cam.pointInsideFrustum([0.0, 0.0, 0.0])):
    # Point is inside frustum !
    # Do something useful !
else:
    # Box is outside the frustum !
```

getCameraToWorld ()

Returns the camera-to-world transform.

Returns the camera-to-world transform matrix.

Return type matrix (4x4 list)

getWorldToCamera ()

Returns the world-to-camera transform.

This returns the inverse matrix of `getCameraToWorld()`.

Returns the world-to-camera transform matrix.

Return type matrix (4x4 list)

setOnTop ()

Set this cameras viewport ontop of all other viewport.

setViewport (*left, bottom, right, top*)

Sets the region of this viewport on the screen in pixels.

Use `bge.render.getWindowHeight` and `bge.render.getWindowWidth` to calculate values relative to the entire display.

Parameters

- **left** (*integer*) – left pixel coordinate of this viewport
- **bottom** (*integer*) – bottom pixel coordinate of this viewport
- **right** (*integer*) – right pixel coordinate of this viewport
- **top** (*integer*) – top pixel coordinate of this viewport

`getScreenPosition` (*object*)

Gets the position of an object projected on screen space.

```
# For an object in the middle of the screen, coord = [0.5, 0.5]
coord = camera.getScreenPosition(object)
```

Parameters **object** (`KX_GameObject` or 3D Vector) – object name or list [x, y, z]

Returns the object's position in screen coordinates.

Return type list [x, y]

`getScreenVect` (*x, y*)

Gets the vector from the camera position in the screen coordinate direction.

Parameters

- **x** (*float*) – X Axis
- **y** (*float*) – Y Axis

Return type 3D Vector

Returns The vector from screen coordinate.

```
# Gets the vector of the camera front direction:
m_vect = camera.getScreenVect(0.5, 0.5)
```

`getScreenRay` (*x, y, dist=inf, property=None*)

Look towards a screen coordinate (x, y) and find first object hit within dist that matches prop. The ray is similar to `KX_GameObject->rayCastTo`.

Parameters

- **x** (*float*) – X Axis
- **y** (*float*) – Y Axis
- **dist** (*float*) – max distance to look (can be negative => look behind); 0 or omitted => detect up to other
- **property** (*string*) – property name that object must have; can be omitted => detect any object

Return type `KX_GameObject`

Returns the first object hit or None if no object or object does not match prop

```
# Gets an object with a property "wall" in front of the camera within a distance of 100:
target = camera.getScreenRay(0.5, 0.5, 100, "wall")
```

class `bge.types.BL_ArmatureObject` (`KX_GameObject`)

An armature object.

constraints

The list of armature constraint defined on this armature. Elements of the list can be accessed by index or string. The key format for string access is '<bone_name>:<constraint_name>'.

Type list of `BL_ArmatureConstraint`

channels

The list of armature channels. Elements of the list can be accessed by index or name the bone.

Type list of `BL_ArmatureChannel`

update ()

Ensures that the armature will be updated on next graphic frame.

This action is unnecessary if a `KX_ArmatureActuator` with mode run is active or if an action is playing. Use this function in other cases. It must be called on each frame to ensure that the armature is updated continuously.

class `bge.types.BL_ArmatureActuator` (*SCA_IActuator*)

Armature Actuators change constraint condition on armatures. Constants related to `type`

KX_ACT_ARMATURE_RUN

Just make sure the armature will be updated on the next graphic frame. This is the only persistent mode of the actuator: it executes automatically once per frame until stopped by a controller

Value 0

KX_ACT_ARMATURE_ENABLE

Enable the constraint.

Value 1

KX_ACT_ARMATURE_DISABLE

Disable the constraint (runtime constraint values are not updated).

Value 2

KX_ACT_ARMATURE_SETTARGET

Change target and subtarget of constraint.

Value 3

KX_ACT_ARMATURE_SETWEIGHT

Change weight of (only for IK constraint).

Value 4

type

The type of action that the actuator executes when it is active.

Can be one of *these constants*

Type integer

constraint

The constraint object this actuator is controlling.

Type `BL_ArmatureConstraint`

target

The object that this actuator will set as primary target to the constraint it controls.

Type `KX_GameObject`

subtarget

The object that this actuator will set as secondary target to the constraint it controls.

Type `KX_GameObject`.

Note: Currently, the only secondary target is the pole target for IK constraint.

weight

The weight this actuator will set on the constraint it controls.

Type `float`.

Note: Currently only the IK constraint has a weight. It must be a value between 0 and 1.

Note: A weight of 0 disables a constraint while still updating constraint runtime values (see [BL_ArmatureConstraint](#))

class `bge.types.KX_ArmatureSensor` (*SCA_ISensor*)

Armature sensor detect conditions on armatures. Constants related to `type`

KX_ARMSENSOR_STATE_CHANGED

Detect that the constraint is changing state (active/inactive)

Value 0

KX_ARMSENSOR_LIN_ERROR_BELOW

Detect that the constraint linear error is above a threshold

Value 1

KX_ARMSENSOR_LIN_ERROR_ABOVE

Detect that the constraint linear error is below a threshold

Value 2

KX_ARMSENSOR_ROT_ERROR_BELOW

Detect that the constraint rotation error is above a threshold

Value 3

KX_ARMSENSOR_ROT_ERROR_ABOVE

Detect that the constraint rotation error is below a threshold

Value 4

type

The type of measurement that the sensor make when it is active.

Can be one of *these constants*

Type `integer`.

constraint

The constraint object this sensor is watching.

Type `BL_ArmatureConstraint`

value

The threshold used in the comparison with the constraint error The linear error is only updated on CopyPose/Distance IK constraint with iTaSC solver The rotation error is only updated on CopyPose+rotation IK constraint with iTaSC solver The linear error on CopyPose is always ≥ 0 : it is the norm of the distance between the target and the bone The rotation error on CopyPose is always ≥ 0 : it is the norm of the equivalent rotation vector between the bone and the target orientations The linear error on Distance

can be positive if the distance between the bone and the target is greater than the desired distance, and negative if the distance is smaller.

Type float

class `bge.types.BL_ArmatureConstraint` (*PyObjectPlus*)
Proxy to Armature Constraint. Allows to change constraint on the fly. Obtained through `BL_ArmatureObject.constraints`.

Note: Not all armature constraints are supported in the GE.

Constants related to `type`

CONSTRAINT_TYPE_TRACKTO

CONSTRAINT_TYPE_KINEMATIC

CONSTRAINT_TYPE_ROTLIKE

CONSTRAINT_TYPE_LOCLIKE

CONSTRAINT_TYPE_MINMAX

CONSTRAINT_TYPE_SIZELIKE

CONSTRAINT_TYPE_LOCKTRACK

CONSTRAINT_TYPE_STRETCHTO

CONSTRAINT_TYPE_CLAMPTO

CONSTRAINT_TYPE_TRANSFORM

CONSTRAINT_TYPE_DISTLIMIT

Constants related to `ik_type`

CONSTRAINT_IK_COPYPOSE

constraint is trying to match the position and eventually the rotation of the target.

Value 0

CONSTRAINT_IK_DISTANCE

Constraint is maintaining a certain distance to target subject to `ik_mode`

Value 1

Constants related to `ik_flag`

CONSTRAINT_IK_FLAG_TIP

Set when the constraint operates on the head of the bone and not the tail

Value 1

CONSTRAINT_IK_FLAG_ROT

Set when the constraint tries to match the orientation of the target

Value 2

CONSTRAINT_IK_FLAG_STRETCH

Set when the armature is allowed to stretch (only the bones with stretch factor > 0.0)

Value 16

CONSTRAINT_IK_FLAG_POS

Set when the constraint tries to match the position of the target.

Value 32Constants related to `ik_mode`**CONSTRAINT_IK_MODE_INSIDE**The constraint tries to keep the bone within `ik_dist` of target**Value** 0**CONSTRAINT_IK_MODE_OUTSIDE**The constraint tries to keep the bone outside `ik_dist` of the target**Value** 1**CONSTRAINT_IK_MODE_ONSURFACE**The constraint tries to keep the bone exactly at `ik_dist` of the target.**Value** 2**type**

Type of constraint, (read-only).

Use one of *these constants*.**Type** integer, one of `CONSTRAINT_TYPE_*` constants**name**Name of constraint constructed as `<bone_name>:<constraint_name>`. constraints list.**Type** stringThis name is also the key subscript on `BL_ArmatureObject`.**enforce**

fraction of constraint effect that is enforced. Between 0 and 1.

Type float**headtail**

Position of target between head and tail of the target bone: 0=head, 1=tail.

Type float.

Note: Only used if the target is a bone (i.e target object is an armature).

lin_error

runtime linear error (in Blender units) on constraint at the current frame.

This is a runtime value updated on each frame by the IK solver. Only available on IK constraint and iTaSC solver.

Type float**rot_error**

Runtime rotation error (in radiant) on constraint at the current frame.

Type float.

This is a runtime value updated on each frame by the IK solver. Only available on IK constraint and iTaSC solver.

It is only set if the constraint has a rotation part, for example, a CopyPose+Rotation IK constraint.

target

Primary target object for the constraint. The position of this object in the GE will be used as target for the constraint.

Type `KX_GameObject`.

subtarget

Secondary target object for the constraint. The position of this object in the GE will be used as secondary target for the constraint.

Type `KX_GameObject`.

Currently this is only used for pole target on IK constraint.

active

True if the constraint is active.

Type `boolean`

Note: An inactive constraint does not update `lin_error` and `rot_error`.

ik_weight

Weight of the IK constraint between 0 and 1.

Only defined for IK constraint.

Type `float`

ik_type

Type of IK constraint, (read-only).

Use one of *these constants*.

Type `integer`.

ik_flag

Combination of IK constraint option flags, read-only.

Use one of *these constants*.

Type `integer`

ik_dist

Distance the constraint is trying to maintain with target, only used when `ik_type=CONSTRAINT_IK_DISTANCE`.

Type `float`

ik_mode

Use one of *these constants*.

Additional mode for IK constraint. Currently only used for Distance constraint:

Type `integer`

class `bge.types.BL_ArmatureChannel` (*PyObjectPlus*)

Proxy to armature pose channel. Allows to read and set armature pose. The attributes are identical to RNA attributes, but mostly in read-only mode.

See `rotation_mode`

`PCHAN_ROT_QUAT`

`PCHAN_ROT_XYZ`

PCHAN_ROT_XZY**PCHAN_ROT_YXZ****PCHAN_ROT_YZX****PCHAN_ROT_ZXY****PCHAN_ROT_ZYX****name**

channel name (=bone name), read-only.

Type string**bone**

return the bone object corresponding to this pose channel, read-only.

Type `BL_ArmatureBone`**parent**

return the parent channel object, None if root channel, read-only.

Type `BL_ArmatureChannel`**has_ik**

true if the bone is part of an active IK chain, read-only. This flag is not set when an IK constraint is defined but not enabled (miss target information for example).

Type boolean**ik_dof_x**

true if the bone is free to rotation in the X axis, read-only.

Type boolean**ik_dof_y**

true if the bone is free to rotation in the Y axis, read-only.

Type boolean**ik_dof_z**

true if the bone is free to rotation in the Z axis, read-only.

Type boolean**ik_limit_x**

true if a limit is imposed on X rotation, read-only.

Type boolean**ik_limit_y**

true if a limit is imposed on Y rotation, read-only.

Type boolean**ik_limit_z**

true if a limit is imposed on Z rotation, read-only.

Type boolean**ik_rot_control**

true if channel rotation should applied as IK constraint, read-only.

Type boolean

ik_lin_control

true if channel size should applied as IK constraint, read-only.

Type boolean

location

displacement of the bone head in armature local space, read-write.

Type vector [X, Y, Z].

Note: You can only move a bone if it is unconnected to its parent. An action playing on the armature may change the value. An IK chain does not update this value, see `joint_rotation`.

Note: Changing this field has no immediate effect, the pose is updated when the armature is updated during the graphic render (see `BL_ArmatureObject.update`).

scale

scale of the bone relative to its parent, read-write.

Type vector [sizeX, sizeY, sizeZ].

Note: An action playing on the armature may change the value. An IK chain does not update this value, see `joint_rotation`.

Note: Changing this field has no immediate effect, the pose is updated when the armature is updated during the graphic render (see `BL_ArmatureObject.update`).

rotation_quaternion

rotation of the bone relative to its parent expressed as a quaternion, read-write.

Type vector [qr, qi, qj, qk].

Note: This field is only used if `rotation_mode` is 0. An action playing on the armature may change the value. An IK chain does not update this value, see `joint_rotation`.

Note: Changing this field has no immediate effect, the pose is updated when the armature is updated during the graphic render (see `BL_ArmatureObject.update`).

rotation_euler

rotation of the bone relative to its parent expressed as a set of euler angles, read-write.

Type vector [X, Y, Z].

Note: This field is only used if `rotation_mode` is > 0. You must always pass the angles in [X, Y, Z] order; the order of applying the angles to the bone depends on `rotation_mode`. An action playing on the armature may change this field. An IK chain does not update this value, see `joint_rotation`.

Note: Changing this field has no immediate effect, the pose is updated when the armature is updated during the graphic render (see `BL_ArmatureObject.update`).

rotation_mode

Method of updating the bone rotation, read-write.

Type integer

Use the following constants (euler mode are named as in Blender UI but the actual axis order is reversed).

- PCHAN_ROT_QUAT(0) : use quaternion in rotation attribute to update bone rotation
- PCHAN_ROT_XYZ(1) : use euler_rotation and apply angles on bone's Z, Y, X axis successively
- PCHAN_ROT_XZY(2) : use euler_rotation and apply angles on bone's Y, Z, X axis successively
- PCHAN_ROT_YXZ(3) : use euler_rotation and apply angles on bone's Z, X, Y axis successively
- PCHAN_ROT_YZX(4) : use euler_rotation and apply angles on bone's X, Z, Y axis successively
- PCHAN_ROT_ZXY(5) : use euler_rotation and apply angles on bone's Y, X, Z axis successively
- PCHAN_ROT_ZYX(6) : use euler_rotation and apply angles on bone's X, Y, Z axis successively

channel_matrix

pose matrix in bone space (deformation of the bone due to action, constraint, etc), Read-only. This field is updated after the graphic render, it represents the current pose.

Type matrix [4][4]

pose_matrix

pose matrix in armature space, read-only, This field is updated after the graphic render, it represents the current pose.

Type matrix [4][4]

pose_head

position of bone head in armature space, read-only.

Type vector [x, y, z]

pose_tail

position of bone tail in armature space, read-only.

Type vector [x, y, z]

ik_min_x

minimum value of X rotation in degree (≤ 0) when X rotation is limited (see ik_limit_x), read-only.

Type float

ik_max_x

maximum value of X rotation in degree (≥ 0) when X rotation is limited (see ik_limit_x), read-only.

Type float

ik_min_y

minimum value of Y rotation in degree (≤ 0) when Y rotation is limited (see ik_limit_y), read-only.

Type float

ik_max_y

maximum value of Y rotation in degree (≥ 0) when Y rotation is limited (see ik_limit_y), read-only.

Type float

ik_min_z

minimum value of Z rotation in degree (≤ 0) when Z rotation is limited (see ik_limit_z), read-only.

Type float

ik_max_z

maximum value of Z rotation in degree (≥ 0) when Z rotation is limited (see `ik_limit_z`), read-only.

Type float

ik_stiffness_x

bone rotation stiffness in X axis, read-only.

Type float between 0 and 1

ik_stiffness_y

bone rotation stiffness in Y axis, read-only.

Type float between 0 and 1

ik_stiffness_z

bone rotation stiffness in Z axis, read-only.

Type float between 0 and 1

ik_stretch

ratio of scale change that is allowed, 0=bone can't change size, read-only.

Type float

ik_rot_weight

weight of rotation constraint when `ik_rot_control` is set, read-write.

Type float between 0 and 1

ik_lin_weight

weight of size constraint when `ik_lin_control` is set, read-write.

Type float between 0 and 1

joint_rotation

Control bone rotation in term of joint angle (for robotic applications), read-write.

When writing to this attribute, you pass a [x, y, z] vector and an appropriate set of euler angles or quaternion is calculated according to the `rotation_mode`.

When you read this attribute, the current pose matrix is converted into a [x, y, z] vector representing the joint angles.

The value and the meaning of the x, y, z depends on the `ik_dof_x/ik_dof_y/ik_dof_z` attributes:

- 1DoF joint X, Y or Z: the corresponding x, y, or z value is used as a joint angle in radian
- 2DoF joint X+Y or Z+Y: treated as 2 successive 1DoF joints: first X or Z, then Y. The x or z value is used as a joint angle in radian along the X or Z axis, followed by a rotation along the new Y axis of y radians.
- 2DoF joint X+Z: treated as a 2DoF joint with rotation axis on the X/Z plane. The x and z values are used as the coordinates of the rotation vector in the X/Z plane.
- 3DoF joint X+Y+Z: treated as a revolute joint. The [x, y, z] vector represents the equivalent rotation vector to bring the joint from the rest pose to the new pose.

Type vector [x, y, z]

Note: The bone must be part of an IK chain if you want to set the `ik_dof_x/ik_dof_y/ik_dof_z` attributes via the UI, but this will interfere with this attribute since the IK solver will overwrite the pose. You can stay in control of the armature if you create an IK constraint but do not finalize it (e.g. don't set a target) the IK solver will not run but the IK panel will show up on the UI for each bone in the chain.

Note: [0, 0, 0] always corresponds to the rest pose.

Note: You must request the armature pose to update and wait for the next graphic frame to see the effect of setting this attribute (see [BL_ArmatureObject.update](#)).

Note: You can read the result of the calculation in rotation or euler_rotation attributes after setting this attribute.

class `bge.types.BL_ArmatureBone` (*PyObjectPlus*)

Proxy to Blender bone structure. All fields are read-only and comply to RNA names. All space attribute correspond to the rest pose.

name

bone name.

Type string

connected

true when the bone head is struck to the parent's tail.

Type boolean

hinge

true when bone doesn't inherit rotation or scale from parent bone.

Type boolean

inherit_scale

true when bone inherits scaling from parent bone.

Type boolean

bbone_segments

number of B-bone segments.

Type integer

roll

bone rotation around head-tail axis.

Type float

head

location of head end of the bone in parent bone space.

Type vector [x, y, z]

tail

location of head end of the bone in parent bone space.

Type vector [x, y, z]

length

bone length.

Type float

arm_head

location of head end of the bone in armature space.

Type vector [x, y, z]

arm_tail

location of tail end of the bone in armature space.

Type vector [x, y, z]

arm_mat

matrix of the bone head in armature space.

Type matrix [4][4]

Note: This matrix has no scale part.

bone_mat

rotation matrix of the bone in parent bone space.

Type matrix [3][3]

parent

parent bone, or None for root bone.

Type `BL_ArmatureBone`

children

list of bone's children.

Type list of `BL_ArmatureBone`

4.2 Game Logic (bge.logic)

4.2.1 Intro

Module to access logic functions, imported automatically into the python controllers namespace.

```
# To get the controller thats running this python script:
cont = bge.logic.getCurrentController() # bge.logic is automatically imported

# To get the game object this controller is on:
obj = cont.owner
```

`KX_GameObject` and `KX_Camera` or `KX_LightObject` methods are available depending on the type of object

```
# To get a sensor linked to this controller.
# "sensorname" is the name of the sensor as defined in the Blender interface.
# +-----+ +-----+
# | Sensor "sensorname" +---+ Python +
# +-----+ +-----+
sens = cont.sensors["sensorname"]

# To get a sequence of all sensors:
sensors = co.sensors
```

See the sensor's reference for available methods:

- `KX_MouseFocusSensor`
- `KX_NearSensor`

- `KX_NetworkMessageSensor`
- `KX_RadarSensor`
- `KX_RaySensor`
- `KX_TouchSensor`
- `SCA_DelaySensor`
- `SCA_JoystickSensor`
- `SCA_KeyboardSensor`
- `SCA_MouseSensor`
- `SCA_PropertySensor`
- `SCA_RandomSensor`

You can also access actuators linked to the controller

```
# To get an actuator attached to the controller:
#
#           +-----+ +-----+
#           + Python +--+ Actuator "actuatorname" |
#           +-----+ +-----+
actuator = co.actuators["actuatorname"]

# Activate an actuator
controller.activate(actuator)
```

See the actuator's reference for available methods

- `BL_ActionActuator`
- `BL_ShapeActionActuator`
- `KX_CameraActuator`
- `KX_ConstraintActuator`
- `KX_GameActuator`
- `KX_IpoActuator`
- `KX_NetworkMessageActuator`
- `KX_ObjectActuator`
- `KX_ParentActuator`
- `KX_SCA_AddObjectActuator`
- `KX_SCA_DynamicActuator`
- `KX_SCA_EndObjectActuator`
- `KX_SCA_ReplaceMeshActuator`
- `KX_SceneActuator`
- `KX_SoundActuator`
- `KX_StateActuator`
- `KX_TrackToActuator`
- `KX_VisibilityActuator`
- `SCA_2DFilterActuator`
- `SCA_PropertyActuator`
- `SCA_RandomActuator`

Most logic brick's methods are accessors for the properties available in the logic buttons. Consult the logic bricks documentation for more information on how each logic brick works.

There are also methods to access the current `bge.types.KX_Scene`

```
# Get the current scene
scene = bge.logic.getCurrentScene()

# Get the current camera
cam = scene.active_camera
```

Matrices as used by the game engine are **row major** `matrix[row][col] = float`

`bge.types.KX_Camera` has some examples using matrices.

4.2.2 Variables

`bge.logic.globalDict`

A dictionary that is saved between loading blend files so you can use it to store inventory and other variables you want to store between scenes and blend files. It can also be written to a file and loaded later on with the game load/save actuators.

Note: only python built in types such as int/string/bool/float/tuples/lists can be saved, GameObjects, Actuators etc will not work as expected.

`bge.logic.keyboard`

The current keyboard wrapped in an `SCA_PythonKeyboard` object.

`bge.logic.mouse`

The current mouse wrapped in an `SCA_PythonMouse` object.

4.2.3 General functions

`bge.logic.getCurrentController()`

Gets the Python controller associated with this Python script.

Return type `bge.types.SCA_PythonController`

`bge.logic.getCurrentScene()`

Gets the current Scene.

Return type `bge.types.KX_Scene`

`bge.logic.getSceneList()`

Gets a list of the current scenes loaded in the game engine.

Return type list of `bge.types.KX_Scene`

Note: Scenes in your blend file that have not been converted wont be in this list. This list will only contain scenes such as overlays scenes.

`bge.logic.loadGlobalDict()`

Loads `bge.logic.globalDict` from a file.

`bge.logic.saveGlobalDict()`

Saves `bge.logic.globalDict` to a file.

`bge.logic.startGame(blend)`

Loads the blend file.

Parameters `blend` (*string*) – The name of the blend file

`bge.logic.endGame()`

Ends the current game.

`bge.logic.restartGame()`

Restarts the current game by reloading the .blend file (the last saved version, not what is currently running).

`bge.logic.LibLoad` (*blend, type, data, load_actions=False, verbose=False*)

Converts the all of the datablocks of the given type from the given blend.

Parameters

- **blend** (*string*) – The path to the blend file (or the name to use for the library if data is supplied)
- **type** (*string*) – The datablock type (currently only “Action”, “Mesh” and “Scene” are supported)
- **data** (*bytes*) – Binary data from a blend file (optional)
- **load_actions** (*bool*) – Search for and load all actions in a given Scene and not just the “active” actions (Scene type only)
- **verbose** (*bool*) – Whether or not to print debugging information (e.g., “SceneName: Scene”)

`bge.logic.LibNew` (*name, type, data*)

Uses existing datablock data and loads in as a new library.

Parameters

- **name** (*string*) – A unique library name used for removal later
- **type** (*string*) – The datablock type (currently only “Mesh” is supported)
- **data** (*list of strings*) – A list of names of the datablocks to load

`bge.logic.LibFree` (*name*)

Frees a library, removing all objects and meshes from the currently active scenes.

Parameters **name** (*string*) – The name of the library to free (the name used in LibNew)

`bge.logic.LibList` ()

Returns a list of currently loaded libraries.

Return type list [str]

`bge.logic.addScene` (*name, overlay=1*)

Loads a scene into the game engine.

Note: This function is not effective immediately, the scene is queued and added on the next logic cycle where it will be available from `getSceneList`

Parameters

- **name** (*string*) – The name of the scene
- **overlay** (*integer*) – Overlay or underlay (optional)

`bge.logic.sendMessage` (*subject, body="" , to="" , message_from=""*)

Sends a message to sensors in any active scene.

Parameters

- **subject** (*string*) – The subject of the message
- **body** (*string*) – The body of the message (optional)
- **to** (*string*) – The name of the object to send the message to (optional)

- **message_from** (*string*) – The name of the object that the message is coming from (optional)

`bge.logic.setGravity` (*gravity*)

Sets the world gravity.

`bge.logic.getSpectrum` ()

Returns a 512 point list from the sound card. This only works if the fmod sound driver is being used.

Return type list [float], len(getSpectrum()) == 512

`bge.logic.stopDSP` ()

Stops the sound driver using DSP effects.

Only the fmod sound driver supports this. DSP can be computationally expensive.

`bge.logic.getMaxLogicFrame` ()

Gets the maximum number of logic frames per render frame.

Returns The maximum number of logic frames per render frame

Return type integer

`bge.logic.setMaxLogicFrame` (*maxlogic*)

Sets the maximum number of logic frames that are executed per render frame. This does not affect the physic system that still runs at full frame rate.

Parameters **maxlogic** (*integer*) – The new maximum number of logic frames per render frame.
Valid values: 1..5

`bge.logic.getMaxPhysicsFrame` ()

Gets the maximum number of physics frames per render frame.

Returns The maximum number of physics frames per render frame

Return type integer

`bge.logic.setMaxPhysicsFrame` (*maxphysics*)

Sets the maximum number of physics timestep that are executed per render frame. Higher value allows physics to keep up with realtime even if graphics slows down the game. Physics timestep is fixed and equal to 1/tickrate (see setLogicTicRate) maxphysics/ticrate is the maximum delay of the renderer that physics can compensate.

Parameters **maxphysics** (*integer*) – The new maximum number of physics timestep per render frame. Valid values: 1..5.

`bge.logic.getLogicTicRate` ()

Gets the logic update frequency.

Returns The logic frequency in Hz

Return type float

`bge.logic.setLogicTicRate` (*ticrate*)

Sets the logic update frequency.

The logic update frequency is the number of times logic bricks are executed every second. The default is 60 Hz.

Parameters **ticrate** (*float*) – The new logic update frequency (in Hz).

`bge.logic.getPhysicsTicRate` ()

Gets the physics update frequency

Returns The physics update frequency in Hz

Return type float

`bge.logic.setPhysicsTicRate` (*ticrate*)

Sets the physics update frequency

The physics update frequency is the number of times the physics system is executed every second. The default is 60 Hz.

Parameters `ticrate` (*float*) – The new update frequency (in Hz).

4.2.4 Utility functions

`bge.logic.expandPath` (*path*)

Converts a blender internal path into a proper file system path.

Use / as directory separator in path You can use '/' at the start of the string to define a relative path; Blender replaces that string by the directory of the startup .blend or runtime file to make a full path name (doesn't change during the game, even if you load other .blend). The function also converts the directory separator to the local file system format.

Parameters `path` (*string*) – The path string to be converted/expanded.

Returns The converted string

Return type string

`bge.logic.getAverageFrameRate` ()

Gets the estimated/average framerate for all the active scenes, not only the current scene.

Returns The estimated average framerate in frames per second

Return type float

`bge.logic.getBlendFileList` (*path = "/"*)

Returns a list of blend files in the same directory as the open blend file, or from using the option argument.

Parameters `path` (*string*) – Optional directory argument, will be expanded (like `expandPath`) into the full path.

Returns A list of filenames, with no directory prefix

Return type list

`bge.logic.getRandomFloat` ()

Returns a random floating point value in the range [0 - 1)

`bge.logic.PrintGLInfo` ()

Prints GL Extension Info into the console

4.2.5 Constants

`bge.logic.KX_TRUE`

True value used by some modules.

`bge.logic.KX_FALSE`

False value used by some modules.

Sensors

Sensor Status

`bge.logic.KX_SENSOR_INACTIVE`
`bge.logic.KX_SENSOR_JUST_ACTIVATED`
`bge.logic.KX_SENSOR_ACTIVE`
`bge.logic.KX_SENSOR_JUST_DEACTIVATED`

Property Sensor

`bge.logic.KX_PROPSENSOR_EQUAL`
Activate when the property is equal to the sensor value.
Value 1

`bge.logic.KX_PROPSENSOR_NOTEQUAL`
Activate when the property is not equal to the sensor value.
Value 2

`bge.logic.KX_PROPSENSOR_INTERVAL`
Activate when the property is between the specified limits.
Value 3

`bge.logic.KX_PROPSENSOR_CHANGED`
Activate when the property changes
Value 4

`bge.logic.KX_PROPSENSOR_EXPRESSION`
Activate when the expression matches
Value 5

Radar Sensor

See `bge.types.KX_RadarSensor`

`bge.logic.KX_RADAR_AXIS_POS_X`
`bge.logic.KX_RADAR_AXIS_POS_Y`
`bge.logic.KX_RADAR_AXIS_POS_Z`
`bge.logic.KX_RADAR_AXIS_NEG_X`
`bge.logic.KX_RADAR_AXIS_NEG_Y`
`bge.logic.KX_RADAR_AXIS_NEG_Z`

Ray Sensor

See `bge.types.KX_RaySensor`

`bge.logic.KX_RAY_AXIS_POS_X`

`bge.logic.KX_RAY_AXIS_POS_Y`

`bge.logic.KX_RAY_AXIS_POS_Z`

`bge.logic.KX_RAY_AXIS_NEG_X`

`bge.logic.KX_RAY_AXIS_NEG_Y`

`bge.logic.KX_RAY_AXIS_NEG_Z`

Actuators

Action Actuator

See `bge.types.BL_ActionActuator`

`bge.logic.KX_ACTIONACT_PLAY`

`bge.logic.KX_ACTIONACT_FLIPPER`

`bge.logic.KX_ACTIONACT_LOOPSTOP`

`bge.logic.KX_ACTIONACT_LOOPEND`

`bge.logic.KX_ACTIONACT_PROPERTY`

Constraint Actuator

See `bge.types.KX_ConstraintActuator.option`

- Applicable to Distance constraint:

`bge.logic.KX_ACT_CONSTRAINT_NORMAL`
Activate alignment to surface

`bge.logic.KX_ACT_CONSTRAINT_DISTANCE`
Activate distance control

`bge.logic.KX_ACT_CONSTRAINT_LOCAL`
Direction of the ray is along the local axis

- Applicable to Force field constraint:

`bge.logic.KX_ACT_CONSTRAINT_DOROTFH`
Force field act on rotation as well

- Applicable to both:

`bge.logic.KX_ACT_CONSTRAINT_MATERIAL`
Detect material rather than property

`bge.logic.KX_ACT_CONSTRAINT_PERMANENT`
No deactivation if ray does not hit target

See `bge.types.KX_ConstraintActuator.limit`

`bge.logic.KX_CONSTRAINTACT_LOCX`
Limit X coord.

`bge.logic.KX_CONSTRAINTACT_LOCY`
Limit Y coord

`bge.logic.KX_CONSTRAINTACT_LOCZ`
Limit Z coord

`bge.logic.KX_CONSTRAINTACT_ROT_X`
Limit X rotation

`bge.logic.KX_CONSTRAINTACT_ROT_Y`
Limit Y rotation

`bge.logic.KX_CONSTRAINTACT_ROT_Z`
Limit Z rotation

`bge.logic.KX_CONSTRAINTACT_DIRNX`
Set distance along negative X axis

`bge.logic.KX_CONSTRAINTACT_DIRNY`
Set distance along negative Y axis

`bge.logic.KX_CONSTRAINTACT_DIRNZ`
Set distance along negative Z axis

`bge.logic.KX_CONSTRAINTACT_DIRPX`
Set distance along positive X axis

`bge.logic.KX_CONSTRAINTACT_DIRPY`
Set distance along positive Y axis

`bge.logic.KX_CONSTRAINTACT_DIRPZ`
Set distance along positive Z axis

`bge.logic.KX_CONSTRAINTACT_ORIX`
Set orientation of X axis

`bge.logic.KX_CONSTRAINTACT_ORIY`
Set orientation of Y axis

`bge.logic.KX_CONSTRAINTACT_ORIZ`
Set orientation of Z axis

`bge.logic.KX_ACT_CONSTRAINT_FHNX`
Set force field along negative X axis

`bge.logic.KX_ACT_CONSTRAINT_FHNY`
Set force field along negative Y axis

`bge.logic.KX_ACT_CONSTRAINT_FHNZ`
Set force field along negative Z axis

`bge.logic.KX_ACT_CONSTRAINT_FHPX`
Set force field along positive X axis

`bge.logic.KX_ACT_CONSTRAINT_FHPY`
Set force field along positive Y axis

`bge.logic.KX_ACT_CONSTRAINT_FHPZ`
Set force field along positive Z axis

Dynamic Actuator

See `bge.types.KX_SCA_DynamicActuator`

`bge.logic.KX_DYN_RESTORE_DYNAMICS`

`bge.logic.KX_DYN_DISABLE_DYNAMICS`
`bge.logic.KX_DYN_ENABLE_RIGID_BODY`
`bge.logic.KX_DYN_DISABLE_RIGID_BODY`
`bge.logic.KX_DYN_SET_MASS`

Game Actuator

See `bge.types.KX_GameActuator`

`bge.logic.KX_GAME_LOAD`
`bge.logic.KX_GAME_START`
`bge.logic.KX_GAME_RESTART`
`bge.logic.KX_GAME_QUIT`
`bge.logic.KX_GAME_SAVECFG`
`bge.logic.KX_GAME_LOADCFG`

IPO Actuator

See `bge.types.KX_IpoActuator`

`bge.logic.KX_IPOACT_PLAY`
`bge.logic.KX_IPOACT_PINGPONG`
`bge.logic.KX_IPOACT_FLIPPER`
`bge.logic.KX_IPOACT_LOOPSTOP`
`bge.logic.KX_IPOACT_LOOPEND`
`bge.logic.KX_IPOACT_FROM_PROP`

Parent Actuator

`bge.logic.KX_PARENT_REMOVE`
`bge.logic.KX_PARENT_SET`

Random Distributions

See `bge.types.SCA_RandomActuator`

`bge.logic.KX_RANDOMACT_BOOL_CONST`
`bge.logic.KX_RANDOMACT_BOOL_UNIFORM`
`bge.logic.KX_RANDOMACT_BOOL_BERNOULLI`
`bge.logic.KX_RANDOMACT_INT_CONST`
`bge.logic.KX_RANDOMACT_INT_UNIFORM`
`bge.logic.KX_RANDOMACT_INT_POISSON`

bge.logic.KX_RANDOMACT_FLOAT_CONST
bge.logic.KX_RANDOMACT_FLOAT_UNIFORM
bge.logic.KX_RANDOMACT_FLOAT_NORMAL
bge.logic.KX_RANDOMACT_FLOAT_NEGATIVE_EXPONENTIAL

Scene Actuator

See [bge.types.KX_SceneActuator](#)

bge.logic.KX_SCENE_RESTART
bge.logic.KX_SCENE_SET_SCENE
bge.logic.KX_SCENE_SET_CAMERA
bge.logic.KX_SCENE_ADD_FRONT_SCENE
bge.logic.KX_SCENE_ADD_BACK_SCENE
bge.logic.KX_SCENE_REMOVE_SCENE
bge.logic.KX_SCENE_SUSPEND
bge.logic.KX_SCENE_RESUME

Shape Action Actuator

See [bge.types.BL_ActionActuator](#)

bge.logic.KX_ACTIONACT_PLAY
bge.logic.KX_ACTIONACT_FLIPPER
bge.logic.KX_ACTIONACT_LOOPSTOP
bge.logic.KX_ACTIONACT_LOOPEND
bge.logic.KX_ACTIONACT_PROPERTY

Sound Actuator

See [bge.types.KX_SoundActuator](#)

bge.logic.KX_SOUNDACT_PLAYSTOP
 Value 1
bge.logic.KX_SOUNDACT_PLAYEND
 Value 2
bge.logic.KX_SOUNDACT_LOOPSTOP
 Value 3
bge.logic.KX_SOUNDACT_LOOPEND
 Value 4
bge.logic.KX_SOUNDACT_LOOPBIDIRECTIONAL

Value 5

`bge.logic.KX_SOUNDACT_LOOPBIDIRECTIONAL_STOP`

Value 6**Various****Input Status**

See `bge.types.SCA_PythonKeyboard`, `bge.types.SCA_PythonMouse`,
`bge.types.SCA_MouseSensor`, `bge.types.SCA_KeyboardSensor`

`bge.logic.KX_INPUT_NONE`

`bge.logic.KX_INPUT_JUST_ACTIVATED`

`bge.logic.KX_INPUT_ACTIVE`

`bge.logic.KX_INPUT_JUST_RELEASED`

Mouse Buttons

See `bge.types.SCA_MouseSensor`

`bge.logic.KX_MOUSE_BUT_LEFT`

`bge.logic.KX_MOUSE_BUT_MIDDLE`

`bge.logic.KX_MOUSE_BUT_RIGHT`

States

See `bge.types.KX_StateActuator`

`bge.logic.KX_STATE1`

`bge.logic.KX_STATE2`

`bge.logic.KX_STATE3`

`bge.logic.KX_STATE4`

`bge.logic.KX_STATE5`

`bge.logic.KX_STATE6`

`bge.logic.KX_STATE7`

`bge.logic.KX_STATE8`

`bge.logic.KX_STATE9`

`bge.logic.KX_STATE10`

`bge.logic.KX_STATE11`

`bge.logic.KX_STATE12`

`bge.logic.KX_STATE13`

`bge.logic.KX_STATE14`

`bge.logic.KX_STATE15`

`bge.logic.KX_STATE16`

`bge.logic.KX_STATE17`

`bge.logic.KX_STATE18`

`bge.logic.KX_STATE19`

`bge.logic.KX_STATE20`

`bge.logic.KX_STATE21`

`bge.logic.KX_STATE22`

`bge.logic.KX_STATE23`

`bge.logic.KX_STATE24`

`bge.logic.KX_STATE25`

`bge.logic.KX_STATE26`

`bge.logic.KX_STATE27`

`bge.logic.KX_STATE28`

`bge.logic.KX_STATE29`

`bge.logic.KX_STATE30`

See `bge.types.KX_StateActuator.operation`

`bge.logic.KX_STATE_OP_CLR`

Subtract bits to state mask

Value 0

`bge.logic.KX_STATE_OP_CPY`

Copy state mask

Value 1

`bge.logic.KX_STATE_OP_NEG`

Invert bits to state mask

Value 2

`bge.logic.KX_STATE_OP_SET`

Add bits to state mask

Value 3

2D Filter

`bge.logic.RAS_2DFILTER_BLUR`

Value 2

`bge.logic.RAS_2DFILTER_CUSTOMFILTER`

Customer filter, the code code is set via `shaderText` property.

Value 12

`bge.logic.RAS_2DFILTER_DILATION`

Value 4

`bge.logic.RAS_2DFILTER_DISABLED`
 Disable the filter that is currently active

Value -1

`bge.logic.RAS_2DFILTER_ENABLED`
 Enable the filter that was previously disabled

Value -2

`bge.logic.RAS_2DFILTER_EROSION`

Value 5

`bge.logic.RAS_2DFILTER_GRAYSCALE`

Value 9

`bge.logic.RAS_2DFILTER_INVERT`

Value 11

`bge.logic.RAS_2DFILTER_LAPLACIAN`

Value 6

`bge.logic.RAS_2DFILTER_MOTIONBLUR`
 Create and enable preset filters

Value 1

`bge.logic.RAS_2DFILTER_NOFILTER`
 Disable and destroy the filter that is currently active

Value 0

`bge.logic.RAS_2DFILTER_PREWITT`

Value 8

`bge.logic.RAS_2DFILTER_SEPIA`

Value 10

`bge.logic.RAS_2DFILTER_SHARPEN`

Value 3

`bge.logic.RAS_2DFILTER_SOBEL`

Value 7**Shader**

`bge.logic.VIEWMATRIX`

`bge.logic.VIEWMATRIX_INVERSE`

`bge.logic.VIEWMATRIX_INVERSETRANSPOSE`

`bge.logic.VIEWMATRIX_TRANSPOSE`

`bge.logic.MODELMATRIX`

`bge.logic.MODELMATRIX_INVERSE`

bge.logic.**MODELMATRIX_INVERSETRANSPOSE**
bge.logic.**MODELMATRIX_TRANSPOSE**
bge.logic.**MODELVIEWMATRIX**
bge.logic.**MODELVIEWMATRIX_INVERSE**
bge.logic.**MODELVIEWMATRIX_INVERSETRANSPOSE**
bge.logic.**MODELVIEWMATRIX_TRANSPOSE**
bge.logic.**CAM_POS**
 Current camera position
bge.logic.**CONSTANT_TIMER**
 User a timer for the uniform value.
bge.logic.**SHD_TANGENT**

Blender Material

bge.logic.**BL_DST_ALPHA**
bge.logic.**BL_DST_COLOR**
bge.logic.**BL_ONE**
bge.logic.**BL_ONE_MINUS_DST_ALPHA**
bge.logic.**BL_ONE_MINUS_DST_COLOR**
bge.logic.**BL_ONE_MINUS_SRC_ALPHA**
bge.logic.**BL_ONE_MINUS_SRC_COLOR**
bge.logic.**BL_SRC_ALPHA**
bge.logic.**BL_SRC_ALPHA_SATURATE**
bge.logic.**BL_SRC_COLOR**
bge.logic.**BL_ZERO**

4.3 Rasterizer (bge.render)

4.3.1 Intro

```
# Example Uses an L{SCA_MouseSensor}, and two L{KX_ObjectActuator}s to implement MouseLook::  
# To use a mouse movement sensor "Mouse" and a  
# motion actuator to mouse look:  
import bge.render  
import bge.logic  
  
# scale sets the speed of motion  
scale = 1.0, 0.5  
  
co = bge.logic.getCurrentController()  
obj = co.getOwner()  
mouse = co.getSensor("Mouse")
```

```

lmotion = co.getActuator("LMove")
wmotion = co.getActuator("WMove")

# Transform the mouse coordinates to see how far the mouse has moved.
def mousePos():
    x = (bge.render.getWindowWidth() / 2 - mouse.getXPosition()) * scale[0]
    y = (bge.render.getWindowHeight() / 2 - mouse.getYPosition()) * scale[1]
    return (x, y)

pos = mousePos()

# Set the amount of motion: X is applied in world coordinates...
lmotion.setTorque(0.0, 0.0, pos[0], False)
# ...Y is applied in local coordinates
wmotion.setTorque(-pos[1], 0.0, 0.0, True)

# Activate both actuators
bge.logic.addActiveActuator(lmotion, True)
bge.logic.addActiveActuator(wmotion, True)

# Centre the mouse
bge.render.setMousePosition(bge.render.getWindowWidth() / 2, bge.render.getWindowHeight() / 2)

```

4.3.2 Constants

bge.render.KX_TEXFACE_MATERIAL
Materials as defined by the texture face settings.

bge.render.KX_BLENDER_MULTITEX_MATERIAL
Materials approximating blender materials with multitexturing.

bge.render.KX_BLENDER_GLSL_MATERIAL
Materials approximating blender materials with GLSL.

4.3.3 Functions

bge.render.getWindowWidth()
Gets the width of the window (in pixels)

Return type integer

bge.render.getWindowHeight()
Gets the height of the window (in pixels)

Return type integer

bge.render.makeScreenshot(filename)
Writes a screenshot to the given filename.

If filename starts with // the image will be saved relative to the current directory. If the filename contains # it will be replaced with the frame number.

The standalone player saves .png files. It does not support colour space conversion or gamma correction.

When run from Blender, makeScreenshot supports Iris, IrisZ, TGA, Raw TGA, PNG, HamX, and Jpeg. Gamma, Colourspace conversion and Jpeg compression are taken from the Render settings panels.

`bge.render.enableVisibility` (*visible*)
Doesn't really do anything...

`bge.render.showMouse` (*visible*)
Enables or disables the operating system mouse cursor.

`bge.render.setMousePosition` (*x, y*)
Sets the mouse cursor position.

`bge.render.setBackgroundColor` (*rgba*)
Sets the window background colour.

`bge.render.setMistColor` (*rgb*)
Sets the mist colour.

`bge.render.setAmbientColor` (*rgb*)
Sets the color of ambient light.

`bge.render.setMistStart` (*start*)
Sets the mist start value. Objects further away than start will have mist applied to them.

`bge.render.setMistEnd` (*end*)
Sets the mist end value. Objects further away from this will be coloured solid with the colour set by `setMistColor()`.

`bge.render.disableMist` ()
Disables mist.

Note: Set any of the mist properties to enable mist.

`bge.render.setEyeSeparation` (*eyesep*)
Sets the eye separation for stereo mode. Usually Focal Length/30 provides a comfortable value.

Parameters `eyesep` (*float*) – The distance between the left and right eye.

`bge.render.getEyeSeparation` ()
Gets the current eye separation for stereo mode.

Return type float

`bge.render.setFocalLength` (*focallength*)
Sets the focal length for stereo mode. It uses the current camera focal length as initial value.

Parameters `focallength` (*float*) – The focal length.

`bge.render.getFocalLength` ()
Gets the current focal length for stereo mode.

Return type float

`bge.render.setMaterialMode` (*mode*)
Set the material mode to use for OpenGL rendering.

Note: Changes will only affect newly created scenes.

`bge.render.getMaterialMode` (*mode*)
Get the material mode to use for OpenGL rendering.

Return type KX_TEXFACE_MATERIAL, KX_BLENDER_MULTITEX_MATERIAL,
KX_BLENDER_GLSL_MATERIAL

`bge.render.setGLSLMaterialSetting` (*setting, enable*)
Enables or disables a GLSL material setting.

`bge.render.getGLSLMaterialSetting` (*setting, enable*)
Get the state of a GLSL material setting.

Return type boolean

`bge.render.setAnisotropicFiltering` (*level*)
Set the anisotropic filtering level for textures.

Parameters *level* (*integer (must be one of 1, 2, 4, 8, 16)*) – The new anisotropic filtering level to use

`bge.render.getAnisotropicFiltering` ()
Get the anisotropic filtering level used for textures.

Return type integer (one of 1, 2, 4, 8, 16)

`bge.render.drawLine` (*fromVec, toVec, color*)
Draw a line in the 3D scene.

Parameters

- **fromVec** (*list [x, y, z]*) – the origin of the line
- **toVec** (*list [x, y, z]*) – the end of the line
- **color** (*list [r, g, b]*) – the color of the line

`bge.render.enableMotionBlur` (*factor*)
Enable the motion blur effect.

Parameters *factor* (*float [0.0 - 1.0]*) – the ammount of motion blur to display.

`bge.render.disableMotionBlur` ()
Disable the motion blur effect.

4.4 Video Texture (bge.texture)

4.4.1 Intro

The `bge.texture` module allows you to manipulate textures during the game.

Several sources for texture are possible: video files, image files, video capture, memory buffer, camera render or a mix of that.

The video and image files can be loaded from the internet using an URL instead of a file name.

In addition, you can apply filters on the images before sending them to the GPU, allowing video effect: blue screen, color band, gray, normal map.

bge.texture uses FFmpeg to load images and videos. All the formats and codecs that FFmpeg supports are supported by this module, including but not limited to:

- * AVI
- * Ogg
- * Xvid
- * Theora
- * dvl394 camera
- * video4linux capture card (this includes many webcams)
- * videoForWindows capture card (this includes many webcams)
- * JPG

The principle is simple: first you identify a texture on an existing object using the `:materialID:` function, then you create a new texture with dynamic content and swap the two textures in the GPU.

The GE is not aware of the substitution and continues to display the object as always, except that you are now in control of the texture.

When the texture object is deleted, the new texture is deleted and the old texture restored.

```
"""
Basic Video Playback
+++++
Example of how to replace a texture in game with a video. It needs to run everyframe
"""
import bge
from bge import texture
from bge import logic

cont = logic.getCurrentController()
obj = cont.owner

# the creation of the texture must be done once: save the
# texture object in an attribute of bge.logic module makes it persistent
if not hasattr(logic, 'video'):

    # identify a static texture by name
    matID = texture.materialID(obj, 'IMvideo.png')

    # create a dynamic texture that will replace the static texture
    logic.video = texture.Texture(obj, matID)

    # define a source of image for the texture, here a movie
    movie = logic.expandPath('//trailer_400p.ogg')
    logic.video.source = texture.VideoFFmpeg(movie)
    logic.video.source.scale = True

    # quick off the movie, but it wont play in the background
    logic.video.source.play()

# you need to call this function every frame to ensure update of the texture.
logic.video.refresh(True)
```

```

"""
Texture replacement
+++++
Example of how to replace a texture in game with an external image.
createTexture() and removeTexture() are to be called from a module Python
Controller.
"""
from bge import logic
from bge import texture

def createTexture(cont):
    """Create a new Dynamic Texture"""
    object = cont.owner

    # get the reference pointer (ID) of the internal texture
    ID = texture.materialID(object, 'IMoriginal.png')

    # create a texture object
    object_texture = texture.Texture(object, ID)

    # create a new source with an external image
    url = logic.expandPath("//newtexture.jpg")
    new_source = texture.ImageFFmpeg(url)

    # the texture has to be stored in a permanent Python object
    logic.texture = object_texture

    # update/replace the texture
    logic.texture.source = new_source
    logic.texture.refresh(False)

def removeTexture(cont):
    """Delete the Dynamic Texture, reversing back the final to its original state."""
    try:
        del logic.texture
    except:
        pass

class bge.texture.VideoFFmpeg(file[, capture=-1, rate=25.0, width=0, height=0])
    FFmpeg video source

    status
        video status

    range
        replay range

    repeat
        repeat count, -1 for infinite repeat

        Type int

    framerate
        frame rate

        Type float

```

valid
Tells if an image is available
Type bool

image
image data

size
image size

scale
fast scale of image (near neighbour)

flip
flip image vertically

filter
pixel filter

preseek
number of frames of preseek
Type int

deinterlace
deinterlace image
Type bool

play ()
Play (restart) video

pause ()
pause video

stop ()
stop video (play will replay it from start)

refresh ()
Refresh video - get its status

class `bge.texture.ImageFFmpeg` (*file*)
FFmpeg image source

status
video status

valid
Tells if an image is available
Type bool

image
image data

size
image size

scale
fast scale of image (near neighbour)

flip
flip image vertically

filter

pixel filter

refresh ()

Refresh image, i.e. load it

reload ([*newname*])

Reload image, i.e. reopen it

class `bge.texture.ImageBuff`

Image source from image buffer

filter

pixel filter

flip

flip image vertically

image

image data

load (*imageBuffer*, *width*, *height*)

Load image from buffer

plot (*imageBuffer*, *width*, *height*, *positionX*, *positionY*)

update image buffer

scale

fast scale of image (near neighbour)

size

image size

valid

bool to tell if an image is available

class `bge.texture.ImageMirror` (*scene*)

Image source from mirror

alpha

use alpha in texture

background

background color

capsize

size of render area

clip

clipping distance

filter

pixel filter

flip

flip image vertically

image

image data

refresh (*imageMirror*)

Refresh image - invalidate its current content

scale
fast scale of image (near neighbour)

size
image size

valid
bool to tell if an image is available

whole
use whole viewport to render

class `bge.texture.ImageMix`
Image mixer

filter
pixel filter

flip
flip image vertically

getSource (*imageMix*)
get image source

getWeight (*imageMix*)
get image source weight

image
image data

refresh (*imageMix*)
Refresh image - invalidate its current content

scale
fast scale of image (near neighbour)

setSource (*imageMix*)
set image source

setWeight (*imageMix*)
set image source weight

valid
bool to tell if an image is available

class `bge.texture.ImageRender` (*scene, camera*)
Image source from render

alpha
use alpha in texture

background
background color

capsize
size of render area

filter
pixel filter

flip
flip image vertically

image
image data

refresh (*imageRender*)
Refresh image - invalidate its current content

scale
fast scale of image (near neighbour)

size
image size

valid
bool to tell if an image is available

whole
use whole viewport to render

class `bge.texture.ImageViewport`
Image source from viewport

alpha
use alpha in texture

capsize
size of viewport area being captured

filter
pixel filter

flip
flip image vertically

image
image data

position
upper left corner of captured area

refresh (*imageViewport*)
Refresh image - invalidate its current content

scale
fast scale of image (near neighbour)

size
image size

valid
bool to tell if an image is available

whole
use whole viewport to capture

class `bge.texture.Texture` (*gameObj*)
Texture objects

bindId
OpenGL Bind Name

close (*texture*)
Close dynamic texture and restore original

mipmap
mipmap texture

refresh (*texture*)
Refresh texture from source

source
source of texture

class `bge.texture.FilterBGR24`
Source filter BGR24 objects

class `bge.texture.FilterBlueScreen`
Filter for Blue Screen objects

color
blue screen color

limits
blue screen color limits

previous
previous pixel filter

class `bge.texture.FilterColor`
Filter for color calculations

matrix
matrix [4][5] for color calculation

previous
previous pixel filter

class `bge.texture.FilterGray`
Filter for gray scale effect

previous
previous pixel filter

class `bge.texture.FilterLevel`
Filter for levels calculations

levels
levels matrix [4] (min, max)

previous
previous pixel filter

class `bge.texture.FilterNormal`
Filter for Blue Screen objects

colorIdx
index of color used to calculate normal (0 - red, 1 - green, 2 - blue)

depth
depth of relief

previous
previous pixel filter

class `bge.texture.FilterRGB24`
Returns a new input filter object to be used with `ImageBuff` object when the image passed to the `ImageBuff.load()` function has the 3-bytes pixel format BGR.

class `bge.texture.FilterRGBA32`

Source filter RGBA32 objects

`bge.texture.getLastError()`

Last error that occurred in a `bge.texture` function.

Returns the description of the last error occurred in a `bge.texture` function.

Return type string

`bge.texture.imageToArray(image, mode)`

Returns a buffer corresponding to the current image stored in a texture source object.

Parameters

- **image** (object of type `VideoFFmpeg`, `ImageFFmpeg`, `ImageBuff`, `ImageMix`, `ImageRender`, `ImageMirror` or `ImageViewport`) – Image source object.
- **mode** (*string*) – optional argument representing the pixel format. You can use the characters R, G, B for the 3 color channels, A for the alpha channel, 0 to force a fixed 0 color channel and 1 to force a fixed 255 color channel. Example: “BGR” will return 3 bytes per pixel with the Blue, Green and Red channels in that order. “RGB1” will return 4 bytes per pixel with the Red, Green, Blue channels in that order and the alpha channel forced to 255. The default mode is “RGBA”.

Return type buffer

Returns A object representing the image as one dimensional array of bytes of size (`pixel_size*width*height`), line by line starting from the bottom of the image. The pixel size and format is determined by the mode parameter.

4.5 Game Keys (bge.events)

4.5.1 Intro

This module holds key constants for the `SCA_KeyboardSensor`.

```
# Set a connected keyboard sensor to accept F1
import bge

co = bge.logic.getCurrentController()
# 'Keyboard' is a keyboard sensor
sensor = co.sensors["Keyboard"]
sensor.key = bge.events.F1KEY

# Do the all keys thing
import bge

co = bge.logic.getCurrentController()
# 'Keyboard' is a keyboard sensor
sensor = co.sensors["Keyboard"]

for key, status in sensor.events:
    # key[0] == bge.events.keycode, key[1] = status
    if status == bge.logic.KX_INPUT_JUST_ACTIVATED:
        if key == bge.events.WKEY:
            # Activate Forward!
```

```
        if key == bge.events.SKEY:
            # Activate Backward!
        if key == bge.events.AKEY:
            # Activate Left!
        if key == bge.events.DKEY:
            # Activate Right!

# The all keys thing without a keyboard sensor (but you will
# need an always sensor with pulse mode on)
import bge

# Just shortening names here
keyboard = bge.logic.keyboard
JUST_ACTIVATED = bge.logic.KX_INPUT_JUST_ACTIVATED

if keyboard.events[bge.events.WKEY] == JUST_ACTIVATED:
    print("Activate Forward!")
if keyboard.events[bge.events.SKEY] == JUST_ACTIVATED:
    print("Activate Backward!")
if keyboard.events[bge.events.AKEY] == JUST_ACTIVATED:
    print("Activate Left!")
if keyboard.events[bge.events.DKEY] == JUST_ACTIVATED:
    print("Activate Right!")
```

4.5.2 Functions

`bge.events.EventToString(event)`

Return the string name of a key event. Will raise a `ValueError` error if its invalid.

Parameters `event (int)` – key event from `bge.keys` or the keyboard sensor.

Return type string

`bge.events.EventToCharacter(event, shift)`

Return the string name of a key event. Returns an empty string if the event cant be represented as a character.

Parameters

- `event (int)` – key event from `bge.keys` or the keyboard sensor.
- `shift (bool)` – set to true if shift is held.

Return type string

4.5.3 Keys (Constants)

Mouse Keys

`bge.events.LEFTMOUSE`

`bge.events.MIDDLEMOUSE`

`bge.events.RIGHTMOUSE`

`bge.events.WHEELUPMOUSE`

`bge.events.WHEELDOWNMOUSE`

`bge.events.MOUSEX`

`bge.events.MOUSEY`

Keyboard Keys

Alphabet keys

`bge.events.AKEY`

`bge.events.BKEY`

`bge.events.CKEY`

`bge.events.DKEY`

`bge.events.EKEY`

`bge.events.FKEY`

`bge.events.GKEY`

`bge.events.HKEY`

`bge.events.IKEY`

`bge.events.JKEY`

`bge.events.KKEY`

`bge.events.LKEY`

`bge.events.MKEY`

`bge.events.NKEY`

`bge.events.OKEY`

`bge.events.PKEY`

`bge.events.QKEY`

`bge.events.RKEY`

`bge.events.SKEY`

`bge.events.TKEY`

`bge.events.UKEY`

`bge.events.VKEY`

`bge.events.WKEY`

`bge.events.XKEY`

`bge.events.YKEY`

`bge.events.ZKEY`

Number keys

`bge.events.ZEROKEY`

`bge.events.ONEKEY`

bge.events.**TWOKEY**
bge.events.**THREEKEY**
bge.events.**FOURKEY**
bge.events.**FIVEKEY**
bge.events.**SIXKEY**
bge.events.**SEVENKEY**
bge.events.**EIGHTKEY**
bge.events.**NINEKEY**

Modifiers Keys

bge.events.**CAPSLOCKKEY**
bge.events.**LEFTCTRLKEY**
bge.events.**LEFTALTKEY**
bge.events.**RIGHTALTKEY**
bge.events.**RIGHTCTRLKEY**
bge.events.**RIGHTSHIFTKEY**
bge.events.**LEFTSHIFTKEY**

Arrow Keys

bge.events.**LEFTARROWKEY**
bge.events.**DOWNARROWKEY**
bge.events.**RIGHTARROWKEY**
bge.events.**UPARROWKEY**

Numberpad Keys

bge.events.**PAD0**
bge.events.**PAD1**
bge.events.**PAD2**
bge.events.**PAD3**
bge.events.**PAD4**
bge.events.**PAD5**
bge.events.**PAD6**
bge.events.**PAD7**
bge.events.**PAD8**
bge.events.**PAD9**

bge.events.**PADPERIOD**
bge.events.**PADSLASHKEY**
bge.events.**PADASTERKEY**
bge.events.**PADMINUS**
bge.events.**PADENTER**
bge.events.**PADPLUSKEY**

Function Keys

bge.events.**F1KEY**
bge.events.**F2KEY**
bge.events.**F3KEY**
bge.events.**F4KEY**
bge.events.**F5KEY**
bge.events.**F6KEY**
bge.events.**F7KEY**
bge.events.**F8KEY**
bge.events.**F9KEY**
bge.events.**F10KEY**
bge.events.**F11KEY**
bge.events.**F12KEY**
bge.events.**F13KEY**
bge.events.**F14KEY**
bge.events.**F15KEY**
bge.events.**F16KEY**
bge.events.**F17KEY**
bge.events.**F18KEY**
bge.events.**F19KEY**

Other Keys

bge.events.**ACCENTGRAVEKEY**
bge.events.**BACKSLASHKEY**
bge.events.**BACKSPACEKEY**
bge.events.**COMMAKEY**
bge.events.**DELKEY**
bge.events.**ENDKEY**
bge.events.**EQUALKEY**

bge.events.**ESCKEY**
bge.events.**HOMEKEY**
bge.events.**INSERTKEY**
bge.events.**LEFTBRACKETKEY**
bge.events.**LINEFEEDKEY**
bge.events.**MINUSKEY**
bge.events.**PAGEDOWNKEY**
bge.events.**PAGEUPKEY**
bge.events.**PAUSEKEY**
bge.events.**PERIODKEY**
bge.events.**QUOTEKEY**
bge.events.**RIGHTBRACKETKEY**
bge.events.**RETKEY** (*Deprecated: use bge.events.ENTERKEY*)
bge.events.**ENTERKEY**
bge.events.**SEMICOLONKEY**
bge.events.**SLASHKEY**
bge.events.**SPACEKEY**
bge.events.**TABKEY**

4.6 Physics Constraints (bge.constraints)

```
"""  
Basic Physics Constraint  
+++++  
Example of how to create a hinge Physics Constraint between two objects.  
"""  
from bge import logic  
from bge import constraints  
  
# get object list  
objects = logic.getCurrentScene().objects  
  
# get object named Object1 and Object 2  
object_1 = objects["Object1"]  
object_2 = objects["Object2"]  
  
# want to use Edge constraint type  
constraint_type = 2  
  
# get Object1 and Object2 physics IDs  
physics_id_1 = object_1.getPhysicsId()  
physics_id_2 = object_2.getPhysicsId()  
  
# Use bottom right edge of Object1 for hinge position  
edge_position_x = 1.0
```

```

edge_position_y = 0.0
edge_position_z = -1.0

# use Object1 y axis for angle to point hinge
edge_angle_x = 0.0
edge_angle_y = 1.0
edge_angle_z = 0.0

# create an edge constraint
constraints.createConstraint(physics_id_1, physics_id_2,
                             constraint_type,
                             edge_position_x, edge_position_y, edge_position_z,
                             edge_angle_x, edge_angle_y, edge_angle_z)

bge.constraints.createConstraint (physicsid, physicsid2, constrainttype, [pivotX, pivotY, pivotZ,
                                                                           [axisX, axisY, axisZ, [flag]]])

```

Creates a constraint.

Parameters

- **physicsid** (*int*) – the physics id of the first object in constraint
- **physicsid2** (*int*) – the physics id of the second object in constraint
- **constrainttype** – the type of the constraint. The constraint types are:

- POINTTOPOINT_CONSTRAINT
- LINEHINGE_CONSTRAINT
- ANGULAR_CONSTRAINT
- CONETWIST_CONSTRAINT
- VEHICLE_CONSTRAINT

Parameters

- **pivotX** (*float*) – pivot X position
- **pivotY** (*float*) – pivot Y position
- **pivotZ** (*float*) – pivot Z position
- **axisX** (*float*) – X axis
- **axisY** (*float*) – Y axis
- **axisZ** (*float*) – Z axis
- **flag** (*int*) –

`bge.constraints.error`

Symbolic constant string that indicates error.

`bge.constraints.exportBulletFile` (*filename*)

export a .bullet file

Parameters `filename` (*string*) – File name

`bge.constraints.getAppliedImpulse` (*constraintId*)

Parameters `constraintId` (*int*) – The id of the constraint.

Returns the most recent applied impulse.

Return type float

`bge.constraints.getVehicleConstraint` (*constraintId*)

Parameters `constraintId` (*int*) – The id of the vehicle constraint.

Returns a vehicle constraint object.

Return type `bge.types.KX_VehicleWrapper`

`bge.constraints.removeConstraint` (*constraintId*)

Removes a constraint.

Parameters `constraintId` (*int*) – The id of the constraint to be removed.

`bge.constraints.setCcdMode` (*ccdMode*)

Note: Very experimental, not recommended

Sets the CCD (Continous Colision Detection) mode in the Physics Environment.

Parameters `ccdMode` (*int*) – The new CCD mode.

`bge.constraints.setContactBreakingTreshold` (*breakingTreshold*)

Note: Reasonable default is 0.02 (if units are meters)

Sets tresholds to do with contact point management.

Parameters `breakingTreshold` (*float*) – The new contact breaking treshold.

`bge.constraints.setDeactivationAngularTreshold` (*angularTreshold*)

Sets the angular velocity treshold.

Parameters `angularTreshold` (*float*) – New deactivation angular treshold.

`bge.constraints.setDeactivationLinearTreshold` (*linearTreshold*)

Sets the linear velocity treshold.

Parameters `linearTreshold` (*float*) – New deactivation linear treshold.

`bge.constraints.setDeactivationTime` (*time*)

Sets the time after which a resting rigidbody gets deactivated.

Parameters `time` (*float*) – The deactivation time.

`bge.constraints.setDebugMode` (*mode*)

Sets the debug mode.

Debug modes:

- `DBG_NODEDEBUG`
- `DBG_DRAWWIREFRAME`
- `DBG_DRAWAABB`
- `DBG_DRAWFREATURESTEXT`
- `DBG_DRAWCONTACTPOINTS`
- `DBG_NOHELPTTEXT`

- `DBG_DRAWTEXT`
- `DBG_PROFILETIMINGS`
- `DBG_ENABLESATCOMPARISION`
- `DBG_DISABLEBULLETLCP`
- `DBG_ENABLECCD`
- `DBG_DRAWCONSTRAINTS`
- `DBG_DRAWCONSTRAINTLIMITS`
- `DBG_FASTWIREFRAME`

Parameters `mode` (*int*) – The new debug mode.

`bge.constraints.setGravity` (*x*, *y*, *z*)
Sets the gravity force.

Parameters

- `x` (*float*) – Gravity X force.
- `y` (*float*) – Gravity Y force.
- `z` (*float*) – Gravity Z force.

`bge.constraints.setLinearAirDamping` (*damping*)

Note: Not implemented.

Sets the linear air damping for rigidbodies.

`bge.constraints.setNumIterations` (*numiter*)
Sets the number of iterations for an iterative constraint solver.

Parameters `numiter` (*int*) – New number of iterations.

`bge.constraints.setNumTimeSubSteps` (*numsubstep*)
Sets the number of substeps for each physics proceed. Tradeoff quality for performance.

Parameters `numsubstep` (*int*) – New number of substeps.

`bge.constraints.setSolverDamping` (*damping*)

Note: Very experimental, not recommended

Sets the damper constant of a penalty based solver.

Parameters `damping` (*float*) – New damping for the solver.

`bge.constraints.setSolverTau` (*tau*)

Note: Very experimental, not recommended

Sets the spring constant of a penalty based solver.

Parameters `tau` (*float*) – New tau for the solver.

`bge.constraints.setSolverType` (*solverType*)

Note: Very experimental, not recommended

Sets the solver type.

Parameters `solverType` (*int*) – The new type of the solver.

`bge.constraints.setSorConstant` (*sor*)

Note: Very experimental, not recommended

Sets the successive overrelaxation constant.

Parameters `sor` (*float*) – New sor value.

`bge.constraints.setUseEpa` (*epa*)

Not implemented.

`bge.constraints.DBG_NODEBUG`

Note: Debug mode to be used with function `setDebugMode`

No debug.

`bge.constraints.DBG_DRAWWIREFRAME`

Note: Debug mode to be used with function `setDebugMode`

Draw wireframe in debug.

`bge.constraints.DBG_DRAWAABB`

Note: Debug mode to be used with function `setDebugMode`

Draw Axis Aligned Bounding Box in debug.

`bge.constraints.DBG_DRAWFEATURESTEXT`

Note: Debug mode to be used with function `setDebugMode`

Draw features text in debug.

`bge.constraints.DBG_DRAWCONTACTPOINTS`

Note: Debug mode to be used with function `setDebugMode`

Draw contact points in debug.

`bge.constraints.DBG_NOHELPTEXT`

Note: Debug mode to be used with function `setDebugMode`

Debug without help text.

`bge.constraints.DBG_DRAWTEXT`

Note: Debug mode to be used with function `setDebugMode`

Draw text in debug.

`bge.constraints.DBG_PROFILETIMINGS`

Note: Debug mode to be used with function `setDebugMode`

Draw profile timings in debug.

`bge.constraints.DBG_ENABLESATCOMPARISION`

Note: Debug mode to be used with function `setDebugMode`

Enable sat comparision in debug.

`bge.constraints.DBG_DISABLEBULLETLCP`

Note: Debug mode to be used with function `setDebugMode`

Disable Bullet LCP.

`bge.constraints.DBG_ENABLECCD`

Note: Debug mode to be used with function `setDebugMode`

Enable Continous Colision Detection in debug.

`bge.constraints.DBG_DRAWCONSTRAINTS`

Note: Debug mode to be used with function `setDebugMode`

Draw constraints in debug.

`bge.constraints.DBG_DRAWCONSTRAINTLIMITS`

Note: Debug mode to be used with function `setDebugMode`

Draw constraint limits in debug.

`bge.constraints.DBG_FASTWIREFRAME`

Note: Debug mode to be used with function `setDebugMode`

Draw a fast wireframe in debug.

`bge.constraints.POINTTOPOINT_CONSTRAINT`

Note: Constraint type to be used with function `createConstraint`

`bge.constraints.LINEHINGE_CONSTRAINT`

Note: Constraint type to be used with function `createConstraint`

`bge.constraints.ANGULAR_CONSTRAINT`

Note: Constraint type to be used with function `createConstraint`

`bge.constraints.CONETWIST_CONSTRAINT`

Note: Constraint type to be used with function `createConstraint`

`bge.constraints.VEHICLE_CONSTRAINT`

Note: Constraint type to be used with function `createConstraint`

API INFO

5.1 Blender API Change Log

5.1.1 2.56 to 2.57

bpy.types.SplineBezierPoints

Function Arguments

- `bpy.types.SplineBezierPoints.friction` (`count`), was (*number*)

bpy.types.RenderSettings

Added

- `bpy.types.RenderSettings.use_stamp_lens`

Removed

- `use_backbuf`

bpy.types.ActionPoseMarkers

Added

- `bpy.types.ActionPoseMarkers.active`
- `bpy.types.ActionPoseMarkers.active_index`

bpy.types.SpaceImageEditor

Renamed

- `curves` -> `bpy.types.SpaceImageEditor.curve`

bpy.types.Scene

Removed

- **network_render**

bpy.types.GameObjectSettings

Added

- `bpy.types.GameObjectSettings.use_material_physics_fh`

Removed

- **use_material_physics**

bpy.types.SplinePoints

Function Arguments

- `bpy.types.SplinePoints.use_material_physics` (count), *was (number)*

bpy.types.Area

Added

- `bpy.types.Area.height`
- `bpy.types.Area.width`

bpy.types.SolidifyModifier

Added

- `bpy.types.SolidifyModifier.material_offset`
- `bpy.types.SolidifyModifier.material_offset_rim`

Removed

- **use_rim_material**

bpy.types.UserPreferencesEdit

Removed

- **use_keyframe_insert_keyingset**

bpy.types.MaterialTextureSlot

Added

- `bpy.types.MaterialTextureSlot.bump_method`
- `bpy.types.MaterialTextureSlot.bump_objectspace`

Removed

- `use_old_bump`

bpy.types.ExplodeModifier

Added

- `bpy.types.ExplodeModifier.particle_uv`
- `bpy.types.ExplodeModifier.use_edge_cut`

Removed

- `use_edge_split`

bpy.types.Node

Added

- `bpy.types.Node.label`

bpy.types.RigidBodyJointConstraint

Added

- `bpy.types.RigidBodyJointConstraint.limit_angle_max_x`
- `bpy.types.RigidBodyJointConstraint.limit_angle_max_y`
- `bpy.types.RigidBodyJointConstraint.limit_angle_max_z`
- `bpy.types.RigidBodyJointConstraint.limit_angle_min_x`
- `bpy.types.RigidBodyJointConstraint.limit_angle_min_y`
- `bpy.types.RigidBodyJointConstraint.limit_angle_min_z`
- `bpy.types.RigidBodyJointConstraint.limit_max_x`
- `bpy.types.RigidBodyJointConstraint.limit_max_y`
- `bpy.types.RigidBodyJointConstraint.limit_max_z`
- `bpy.types.RigidBodyJointConstraint.limit_min_x`
- `bpy.types.RigidBodyJointConstraint.limit_min_y`

- `bpy.types.RigidBodyJointConstraint.limit_min_z`

Removed

- `limit_cone_max`
- `limit_cone_min`
- `limit_generic_max`
- `limit_generic_min`

`bpy.types.KeyMap`

Renamed

- `items` -> `bpy.types.KeyMap.keymap_items`

`bpy.types.SpaceNodeEditor`

Added

- `bpy.types.SpaceNodeEditor.backdrop_channels`
- `bpy.types.SpaceNodeEditor.backdrop_x`
- `bpy.types.SpaceNodeEditor.backdrop_y`
- `bpy.types.SpaceNodeEditor.backdrop_zoom`
- `bpy.types.SpaceNodeEditor.use_auto_render`

`bpy.types.SPHFluidSettings`

Added

- `bpy.types.SPHFluidSettings.factor_density`
- `bpy.types.SPHFluidSettings.factor_radius`
- `bpy.types.SPHFluidSettings.factor_repulsion`
- `bpy.types.SPHFluidSettings.factor_rest_length`
- `bpy.types.SPHFluidSettings.factor_stiff_viscosity`
- `bpy.types.SPHFluidSettings.plasticity`
- `bpy.types.SPHFluidSettings.repulsion`
- `bpy.types.SPHFluidSettings.spring_frames`
- `bpy.types.SPHFluidSettings.stiff_viscosity`
- `bpy.types.SPHFluidSettings.use_initial_rest_length`
- `bpy.types.SPHFluidSettings.use_viscoelastic_springs`
- `bpy.types.SPHFluidSettings.yield_ratio`

Removed

- **stiffness_near**
- **viscosity_beta**

Renamed

- **viscosity_omega** -> `bpy.types.SPHFluidSettings.linear_viscosity`

bpy.types.ConstraintActuator**Added**

- `bpy.types.ConstraintActuator.direction_axis_pos`
- `bpy.types.ConstraintActuator.fh_force`

Removed

- **spring**

bpy.types.UILayout**Renamed**

- **operator_enums** -> `bpy.types.UILayout.operator_enum`

bpy.types.SpaceDopeSheetEditor**Added**

- `bpy.types.SpaceDopeSheetEditor.show_pose_markers`

bpy.types.ToolSettings**Added**

- `bpy.types.ToolSettings.edge_path_live_unwrap`
- `bpy.types.ToolSettings.proportional_size`
- `bpy.types.ToolSettings.use_keyframe_insert_keyingset`

bpy.types.EditBone

Added

- `bpy.types.EditBone.bbone_x`
- `bpy.types.EditBone.bbone_z`

Function Arguments

- `bpy.types.EditBone.bbone_z` (self, matrix, scale, roll), was (*self, matrix*)

bpy.types.ID

Renamed

- **update** -> `bpy.types.ID.update_tag`

bpy.types.SpaceGraphEditor

Added

- `bpy.types.SpaceGraphEditor.use_fancy_drawing`

bpy.types.ParticleSystem

Added

- `bpy.types.ParticleSystem.child_seed`

bpy.types.SpaceTimeline

Removed

- **use_play_3d_editors**
- **use_play_animation_editors**
- **use_play_image_editors**
- **use_play_node_editors**
- **use_play_properties_editors**
- **use_play_sequence_editors**
- **use_play_top_left_3d_editor**

bpy.types.Mesh

Added

- `bpy.types.Mesh.validate`

Renamed

- `show_extra_edge_angle` -> `bpy.types.Mesh.show_extra_face_angle`

Function Arguments

- `bpy.types.Mesh.show_extra_face_angle` (`self`, `vertices`, `edges`, `faces`), *was* (`self`, `verts`, `edges`, `faces`)

bpy.types.EnumProperty

Added

- `bpy.types.EnumProperty.default_flag`

Renamed

- `items` -> `bpy.types.EnumProperty.enum_items`

bpy.types.Screen

Added

- `bpy.types.Screen.use_play_3d_editors`
- `bpy.types.Screen.use_play_animation_editors`
- `bpy.types.Screen.use_play_image_editors`
- `bpy.types.Screen.use_play_node_editors`
- `bpy.types.Screen.use_play_properties_editors`
- `bpy.types.Screen.use_play_sequence_editors`
- `bpy.types.Screen.use_play_top_left_3d_editor`

bpy.types.MirrorModifier

Added

- `bpy.types.MirrorModifier.use_mirror_merge`

bpy.types.Operator

Added

- `bpy.types.Operator.cancel`

bpy.types.Brush

Added

- `bpy.types.Brush.height`
- `bpy.types.Brush.use_fixed_texture`

Renamed

- `imagepaint_tool` -> `bpy.types.Brush.image_tool`
- `use_paint_texture` -> `bpy.types.Brush.use_paint_image`
- `vertexpaint_tool` -> `bpy.types.Brush.vertex_tool`

bpy.types.Key

Renamed

- `keys` -> `bpy.types.Key.key_blocks`

bpy.types.CompositorNodeBlur

Added

- `bpy.types.CompositorNodeBlur.aspect_correction`

bpy.types.SpaceTextEditor

Added

- `bpy.types.SpaceTextEditor.margin_column`
- `bpy.types.SpaceTextEditor.show_margin`

bpy.types.GPencilLayer

Added

- `bpy.types.GPencilLayer.show_x_ray`

Removed

- **active**

bpy.types.MarbleTexture**Renamed**

- **noisebasis_2** -> `bpy.types.MarbleTexture.noise_basis_2`

bpy.types.Particle**Removed**

- **is_hair**

Renamed

- **keys** -> `bpy.types.Particle.hair_keys`
- **keys** -> `bpy.types.Particle.particle_keys`

bpy.types.Modifier**Added**

- `bpy.types.Modifier.use_apply_on_spline`

bpy.types.Property**Added**

- `bpy.types.Property.is_enum_flag`

bpy.types.SpaceProperties**Added**

- `bpy.types.SpaceProperties.texture_context`

Removed

- **show_brush_texture**

bpy.types.VertexGroups

Added

- `bpy.types.VertexGroups.remove`

Removed

- **assign**

bpy.types.Material

Added

- `bpy.types.Material.shadow_only_type`

bpy.types.RenderLayer

Function Arguments

- `bpy.types.RenderLayer.shadow_only_type (filename, x, y), was (filename)`

bpy.types.Object

Added

- `bpy.types.Object.is_modified`

Renamed

- **create_dupli_list** -> `bpy.types.Object.dupli_list_create`
- **create_mesh** -> `bpy.types.Object.to_mesh`
- **free_dupli_list** -> `bpy.types.Object.dupli_list_clear`

bpy.types.NodeTree

Added

- `bpy.types.NodeTree.inputs`
- `bpy.types.NodeTree.outputs`

bpy.types.DopeSheet

Added

- `bpy.types.DopeSheet.filter_fcurve_name`
- `bpy.types.DopeSheet.show_lattices`
- `bpy.types.DopeSheet.show_only_matching_fcurves`

bpy.types.ActionFCurves

Function Arguments

- `bpy.types.ActionFCurves.show_only_matching_fcurves` (`data_path`, `index`, `action_group`),
was (`data_path`, `array_index`, `action_group`)

bpy.types.ShrinkwrapModifier

Added

- `bpy.types.ShrinkwrapModifier.cull_face`

Removed

- `use_cull_back_faces`
- `use_cull_front_faces`

bpy.types.WindowManager

Added

- `bpy.types.WindowManager.addon_filter`
- `bpy.types.WindowManager.addon_search`
- `bpy.types.WindowManager.addon_support`
- `bpy.types.WindowManager.event_timer_add`
- `bpy.types.WindowManager.event_timer_remove`

bpy.types.WoodTexture

Renamed

- `noisebasis_2` -> `bpy.types.WoodTexture.noise_basis_2`

bpy.types.VertexGroup

Added

- `bpy.types.VertexGroup.add`
- `bpy.types.VertexGroup.remove`
- `bpy.types.VertexGroup.weight`

bpy.types.FCurveKeyframePoints

Added

- `bpy.types.FCurveKeyframePoints.insert`

Function Arguments

- `bpy.types.FCurveKeyframePoints.insert` (*count*), *was* (*frame, value, replace, needed, fast*)

bpy.types.ThemeView3D

Added

- `bpy.types.ThemeView3D.outline_width`

bpy.types.Image

Added

- `bpy.types.Image.pixels`

bpy.types.Bone

Added

- `bpy.types.Bone.bbone_x`
- `bpy.types.Bone.bbone_z`

bpy.types.InputKeyMapPanel

Removed

- `draw_entry`
- `draw_filtered`
- `draw_hierarchy`

- **draw_keymaps**
- **draw_km**
- **draw_kmi**
- **draw_kmi_properties**
- **indented_layout**

bpy.types.ParticleSettings

Added

- `bpy.types.ParticleSettings.active_texture`
- `bpy.types.ParticleSettings.active_texture_index`
- `bpy.types.ParticleSettings.child_parting_factor`
- `bpy.types.ParticleSettings.child_parting_max`
- `bpy.types.ParticleSettings.child_parting_min`
- `bpy.types.ParticleSettings.color_maximum`
- `bpy.types.ParticleSettings.create_long_hair_children`
- `bpy.types.ParticleSettings.draw_color`
- `bpy.types.ParticleSettings.effector_amount`
- `bpy.types.ParticleSettings.grid_random`
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- `bpy.types.ParticleSettings.kink_flat`
- `bpy.types.ParticleSettings.texture_slots`
- `bpy.types.ParticleSettings.timestep`
- `bpy.types.ParticleSettings.use_advanced_hair`

Removed

- **reaction_shape**
- **show_material_color**
- **use_animate_branching**
- **use_branching**
- **use_symmetric_branching**

bpy.types.SceneGameData

Added

- `bpy.types.SceneGameData.show_mouse`

bpy.types.MaterialPhysics

Renamed

- **damping** -> `bpy.types.MaterialPhysics.fh_damping`
- **distance** -> `bpy.types.MaterialPhysics.fh_distance`
- **force** -> `bpy.types.MaterialPhysics.fh_force`
- **use_normal_align** -> `bpy.types.MaterialPhysics.use_fh_normal`

5.1.2 2.57 to 2.58

bpy_extras

Added

- `bpy_extras`
- `bpy_extras.view3d_utils`

Moved

- `io_utils` -> `bpy_extras.io_utils`
- `image_utils` -> `bpy_extras.image_utils`
- `mesh_utils` -> `bpy_extras.mesh_utils`
- `object_utils` -> `bpy_extras.object_utils`

bpy.types.RenderSettings

Added

- `bpy.types.RenderSettings.use_bake_lores_mesh`
- `bpy.types.RenderSettings.use_bake_multires`

bpy.types.Camera

Added

- `bpy.types.Camera.show_guide`

bpy.types.SpaceImageEditor

Added

- `bpy.types.SpaceImageEditor.zoom`

bpy.types.SpaceView3D

Added

- `bpy.types.SpaceView3D.lock_camera`

bpy.types.RegionView3D

Added

- `bpy.types.RegionView3D.is_perspective`

bpy.types.Scene

Added

- `bpy.types.Scene.frame_subframe`

bpy.types.Area

Removed

- `active_space`

bpy.types.DisplaceModifier

Renamed

- `texture_coordinate_object` -> `bpy.types.DisplaceModifier.texture_coords_object`

bpy.types.UserPreferencesView

Added

- `bpy.types.UserPreferencesView.use_camera_lock_parent`

bpy.types.DomainFluidSettings

Added

- `bpy.types.DomainFluidSettings.fluid_mesh_vertices`
- `bpy.types.DomainFluidSettings.surface_noobs`

bpy.types.Sculpt

Added

- `bpy.types.Sculpt.use_deform_only`

bpy.types.ClothCollisionSettings

Added

- `bpy.types.ClothCollisionSettings.distance_repel`
- `bpy.types.ClothCollisionSettings.repel_force`

bpy.types.UILayout

Added

- `bpy.types.UILayout.template_edit_mode_selection`

bpy.types.ToolSettings

Added

- `bpy.types.ToolSettings.use_snap_project_self`

bpy.types.Mesh

Removed

- `edge_face_count`
- `edge_face_count_dict`
- `edge_loops_from_edges`
- `edge_loops_from_faces`

bpy.types.PointDensity**Added**

- `bpy.types.PointDensity.falloff_curve`
- `bpy.types.PointDensity.falloff_speed_scale`
- `bpy.types.PointDensity.use_falloff_curve`

bpy.types.SpaceTextEditor**Added**

- `bpy.types.SpaceTextEditor.use_match_case`

bpy.types.CameraActuator**Added**

- `bpy.types.CameraActuator.damping`

bpy.types.Property**Added**

- `bpy.types.Property.is_skip_save`

bpy.types.UserPreferencesSystem**Added**

- `bpy.types.UserPreferencesSystem.anisotropic_filter`

bpy.types.Object**Added**

- `bpy.types.Object.empty_image_offset`

bpy.types.Image**Added**

- `bpy.types.Image.resolution`

bpy.types.SceneGameData

Added

- `bpy.types.SceneGameData.use_gls_l_color_management`

5.1.3 2.58 to 2.59

bpy.types.Scene

Function Arguments

- `bpy.types.Scene.collada_export (filepath, selected), was (filepath)`

bpy.types.MultiresModifier

Added

- `bpy.types.MultiresModifier.use_subsurf_uv`

bpy.types.KeyMap

Removed

- `copy_to_user`

Renamed

- `is_user_defined` -> `bpy.types.KeyMap.is_user_modified`

bpy.types.SceneRenderLayer

Added

- `bpy.types.SceneRenderLayer.use_pass_material_index`

bpy.types.ToolSettings

Renamed

- `use_snap_project_self` -> `bpy.types.ToolSettings.use_snap_self`

bpy.types.UserPreferencesInput

Added

- `bpy.types.UserPreferencesInput.ndof_fly_helicopter`
- `bpy.types.UserPreferencesInput.ndof_lock_horizon`
- `bpy.types.UserPreferencesInput.ndof_orbit_invert_axes`
- `bpy.types.UserPreferencesInput.ndof_sensitivity`
- `bpy.types.UserPreferencesInput.ndof_show_guide`
- `bpy.types.UserPreferencesInput.ndof_zoom_invert`
- `bpy.types.UserPreferencesInput.ndof_zoom_updown`

Removed

- `edited_keymaps`
- `ndof_pan_speed`
- `ndof_rotate_speed`

bpy.types.IDMaterials

Function Arguments

- `bpy.types.IDMaterials.pop` (`index`, `update_data`), *was* (`index`)

bpy.types.Material

Added

- `bpy.types.Material.pass_index`

bpy.types.RenderLayer

Added

- `bpy.types.RenderLayer.use_pass_material_index`

bpy.types.Object

Added

- `bpy.types.Object.closest_point_on_mesh`

bpy.types.ThemeNodeEditor

Added

- `bpy.types.ThemeNodeEditor.noodle_curving`

bpy.types.ChildOfConstraint

Added

- `bpy.types.ChildOfConstraint.inverse_matrix`

bpy.types.KeyConfigurations

Added

- `bpy.types.KeyConfigurations.addon`
- `bpy.types.KeyConfigurations.user`

bpy.types.Image

Added

- `bpy.types.Image.use_generated_float`

bpy.types.KeyMapItem

Added

- `bpy.types.KeyMapItem.is_user_modified`

5.1.4 2.59 to 2.60

bpy.types.MeshTextureFace

Removed

- `use_image`
- `use_object_color`
- `use_blend_shared`

Moved

- **hide** -> `bpy.types.Material.game_settings.invisible`
- **use_collision** -> `bpy.types.Material.game_settings.physics`
- **use_light** -> `bpy.types.Material.game_settings.use_shadeless`
- **use_twoside** -> `bpy.types.Material.game_settings.backface_culling`
- **use_bitmap_text** -> `bpy.types.Material.game_settings.text`
- **blend_type** -> `bpy.types.Material.game_settings.alpha_blend`
- **use_alpha_sort** -> `bpy.types.Material.game_settings.alpha_blend`
- **use_billboard** -> `bpy.types.Material.game_settings.face_orientation`
- **use_halo** -> `bpy.types.Material.game_settings.face_orientation`
- **use_shadow_cast** -> `bpy.types.Material.game_settings.face_orientation`

`bpy.types.RenderSettings`

Added

- `bpy.types.RenderSettings.ffmpeg_audio_channels`

`bpy.types.DriverTarget`

Added

- `bpy.types.DriverTarget.transform_space`

Removed

- **use_local_space_transform**

`bpy.types.Sound`

Added

- `bpy.types.Sound.factory`
- `bpy.types.Sound.use_mono`

`bpy.types.Camera`

Added

- `bpy.types.Camera.view_frame`

bpy.types.Scene

Added

- `bpy.types.Scene.audio_volume`

bpy.types.KeyingSet

Added

- `bpy.types.KeyingSet.refresh`

bpy.types.Armature

Added

- `bpy.types.Armature.deform_method`

bpy.types.GameObjectSettings

Added

- `bpy.types.GameObjectSettings.obstacle_radius`
- `bpy.types.GameObjectSettings.use_obstacle_create`

bpy.types.BlendData

Added

- `bpy.types.BlendData.speakers`

bpy.types.SolidifyModifier

Added

- `bpy.types.SolidifyModifier.thickness_vertex_group`

bpy.types.ThemeGraphEditor

Added

- `bpy.types.ThemeGraphEditor.handle_auto_clamped`
- `bpy.types.ThemeGraphEditor.handle_sel_auto_clamped`

bpy.types.CompositorNodeIDMask**Added**

- `bpy.types.CompositorNodeIDMask.use_smooth_mask`

bpy.types.Node**Added**

- `bpy.types.Node.parent`

bpy.types.Texture**Added**

- `bpy.types.Texture.evaluate`

bpy.types.UILayout**Added**

- `bpy.types.UILayout.template_keymap_item_properties`

bpy.types.ToolSettings**Added**

- `bpy.types.ToolSettings.use_multipaint`

bpy.types.UserPreferencesInput**Added**

- `bpy.types.UserPreferencesInput.ndof_panx_invert_axis`
- `bpy.types.UserPreferencesInput.ndof_pany_invert_axis`
- `bpy.types.UserPreferencesInput.ndof_panz_invert_axis`
- `bpy.types.UserPreferencesInput.ndof_roll_invert_axis`
- `bpy.types.UserPreferencesInput.ndof_rotate_invert_axis`
- `bpy.types.UserPreferencesInput.ndof_tilt_invert_axis`

bpy.types.LockedTrackConstraint

Added

- `bpy.types.LockedTrackConstraint.head_tail`

bpy.types.SpaceGraphEditor

Moved

- `use_fancy_drawing` -> `bpy.types.SpaceGraphEditor.use_beauty_drawing`

bpy.types.ParticleSystem

Added

- `bpy.types.ParticleSystem.dt_frac`

bpy.types.Mesh

Added

- `bpy.types.Mesh.use_paint_mask_vertex`

bpy.types.FCurve

Removed

- `use_auto_handle_clamp`

bpy.types.DampedTrackConstraint

Added

- `bpy.types.DampedTrackConstraint.head_tail`

bpy.types.ImageTexture

Added

- `bpy.types.ImageTexture.use_derivative_map`

bpy.types.SoundSequence

Added

- `bpy.types.SoundSequence.pan`
- `bpy.types.SoundSequence.pitch`

Removed

- **attenuation**

bpy.types.FModifier

Added

- `bpy.types.FModifier.blend_in`
- `bpy.types.FModifier.blend_out`
- `bpy.types.FModifier.frame_end`
- `bpy.types.FModifier.frame_start`
- `bpy.types.FModifier.influence`
- `bpy.types.FModifier.use_influence`
- `bpy.types.FModifier.use_restricted_range`

bpy.types.EnvironmentMap

Added

- `bpy.types.EnvironmentMap.clear`
- `bpy.types.EnvironmentMap.is_valid`
- `bpy.types.EnvironmentMap.save`

bpy.types.UserPreferencesSystem

Added

- `bpy.types.UserPreferencesSystem.use_translate_interface`

Removed

- **use_translate_buttons**
- **use_translate_toolbox**

bpy.types.LimitDistanceConstraint

Added

- `bpy.types.LimitDistanceConstraint.head_tail`
- `bpy.types.LimitDistanceConstraint.use_transform_limit`

bpy.types.MovieSequence

Added

- `bpy.types.MovieSequence.stream_index`

bpy.types.Material

Added

- `bpy.types.Material.game_settings`

bpy.types.Object

Added

- `bpy.types.Object.matrix_parent_inverse`

bpy.types.SequenceProxy

Added

- `bpy.types.SequenceProxy.build_100`
- `bpy.types.SequenceProxy.build_25`
- `bpy.types.SequenceProxy.build_50`
- `bpy.types.SequenceProxy.build_75`
- `bpy.types.SequenceProxy.build_free_run`
- `bpy.types.SequenceProxy.build_free_run_rec_date`
- `bpy.types.SequenceProxy.build_record_run`
- `bpy.types.SequenceProxy.quality`
- `bpy.types.SequenceProxy.timecode`

bpy.types.Sequence

Added

- `bpy.types.Sequence.waveform`

bpy.types.DopeSheet

Added

- `bpy.types.DopeSheet.show_datablock_filters`
- `bpy.types.DopeSheet.show_speakers`

bpy.types.ActionActuator

Added

- `bpy.types.ActionActuator.apply_to_children`
- `bpy.types.ActionActuator.layer`
- `bpy.types.ActionActuator.layer_weight`
- `bpy.types.ActionActuator.use_additive`
- `bpy.types.ActionActuator.use_force`
- `bpy.types.ActionActuator.use_local`

bpy.types.VertexGroup

Added

- `bpy.types.VertexGroup.lock_weight`

bpy.types.ThemeView3D

Added

- `bpy.types.ThemeView3D.speaker`

bpy.types.Image

Added

- `bpy.types.Image.pack`
- `bpy.types.Image.unpack`

bpy.types.Curve

Added

- `bpy.types.Curve.fill_mode`

Removed

- `use_fill_back`
- `use_fill_front`

`bpy.types.ParticleSettings`

Added

- `bpy.types.ParticleSettings.adaptive_subframes`
- `bpy.types.ParticleSettings.courant_target`

`bpy.types.SceneGameData`

Added

- `bpy.types.SceneGameData.level_height`
- `bpy.types.SceneGameData.obstacle_simulation`
- `bpy.types.SceneGameData.recast_data`
- `bpy.types.SceneGameData.restrict_animation_updates`
- `bpy.types.SceneGameData.show_obstacle_simulation`

Note: The Blender Python API has areas which are still in development.

The following areas are subject to change.

- operator behavior, names and arguments
- mesh creation and editing functions

These parts of the API are relatively stable and are unlikely to change significantly

- data API, access to attributes of blender data such as mesh verts, material color, timeline frames and scene objects
 - user interface functions for defining buttons, creation of menus, headers, panels
 - render engine integration
 - modules: `bgl`, `mathutils` & game engine.
-

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