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# **Blender Index**

***Release 2.54 - UNSTABLE API***

**Blender Foundation**

October 23, 2010



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This document is an API reference for Blender 2.54 . built Unknown.

An introduction to Blender and Python can be found at <<http://wiki.blender.org/index.php/Dev:2.5/Py/API/Intro>>

A PDF version of this document is also available

**Warning:** The Python API in Blender is **UNSTABLE**, It should only be used for testing, any script written now may break in future releases.

**The following areas are subject to change.**

- operator names and arguments
- render api
- function calls with the data api (any function calls with values accessed from bpy.data), including functions for importing and exporting meshes
- class registration (Operator, Panels, Menus, Headers)
- modules: bpy.props, blf)
- members in the bpy.context have to be reviewed
- python defined modal operators, especially drawing callbacks are highly experimental

**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
- modules: bgl, mathutils and geometry
- game engine modules



# APPLICATION MODULES

## 1.1 Data Access (bpy.data)

This module is used for all blender/python access.

```
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.unlink(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 %dx%d\n" % (image.filepath, image.size[0], image.size[1]))

file.close()

bpy.data
    Access to blenders internal data
    Type bpy.types.BlendData
```

## 1.2 Operators (bpy.ops)

### 1.2.1 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` (*left\_right='OFF', extend=False, column=False*)  
Select keyframes by clicking on them

#### Parameters

- **left\_right** (*enum in ['CHECK', 'OFF', 'LEFT', 'RIGHT'], (optional, never None)*) – Left Right
- **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` (*mode=17*)  
Make a copy of all selected keyframes

#### Parameters

- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.action.extrapolation_type` (*type='CONSTANT'*)  
Set extrapolation mode for selected F-Curves

#### Parameters

- **type** (*enum in ['CONSTANT', 'LINEAR'], (optional, never None)*) – Type

`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', 'ANIM\_CLAMPED'], (optional, never None)*) – Type

`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, never None)*) – Type

`bpy.ops.action.keyframe_insert` (*type='ALL'*)  
Insert keyframes for the specified channels

#### Parameters



- **type** (enum in ['ALL', 'SEL', 'GROUP'], (optional, never None)) – Type

`bpy.ops.action.keyframe_type` (*type*='KEYFRAME')  
Set type of keyframe for the selected keyframes

#### Parameters

- **type** (enum in ['KEYFRAME', 'BREAKDOWN', 'EXTREME'], (optional, never None)) – Type

`bpy.ops.action.mirror` (*type*='CFRA')  
Flip selected keyframes over the selected mirror line

#### Parameters

- **type** (enum in ['CFRA', 'XAXIS', 'MARKER'], (optional, never None)) – Type

`bpy.ops.action.new` ()  
Create new action

`bpy.ops.action.paste` ()  
Paste keyframes from copy/paste buffer for the selected channels, starting on the current frame

`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, *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
- **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, never None)) – Mode

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

`bpy.ops.action.select_linked` ()  
Select keyframes occurring 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, never None)) – Type

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

## 1.2.2 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, never None)) – Mode
- **type** (enum in ['PROTECT', 'MUTE'], (optional, never None)) – 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_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*)  
 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

`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, never None)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional, never None)*) – 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, never None)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional, never None)*) – Type

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

#### Parameters

- **mode** (*enum in ['TOGGLE', 'DISABLE', 'ENABLE', 'INVERT'], (optional, never None)*) – Mode
- **type** (*enum in ['PROTECT', 'MUTE'], (optional, never None)*) – 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.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=0, confirm\_success=True*)  
Delete keyframes on the current frame for all properties in the specified Keying Set

**Parameters**

- **type** (*int in [-inf, inf], (optional)*) – Keying Set Number, Index (determined internally) of 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` ()  
Undocumented ([contribute](#))

`bpy.ops.anim.keyframe_insert` (*type=0, confirm\_success=True*)  
Insert keyframes on the current frame for all properties in the specified Keying Set

**Parameters**

- **type** (*int in [-inf, inf], (optional)*) – Keying Set Number, Index (determined internally) of 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=0, confirm\_success=False, always\_prompt=False*)  
Undocumented ([contribute](#))

**Parameters**

- **type** (*int in [-inf, inf], (optional)*) – Keying Set Number, Index (determined internally) of 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, Filepath to write file to.
- **filter\_folder** (*boolean, (optional)*) – Filter folders
- **filter\_text** (*boolean, (optional)*) – Filter text
- **filter\_python** (*boolean, (optional)*) – Filter python

**File** `ui/properties_scene.py:218`

`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()`  
Undocumented (`contribute`)

`bpy.ops.anim.previewrange_set(xmin=0, xmax=0, ymin=0, ymax=0)`  
Undocumented (`contribute`)

**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()`  
Undocumented (`contribute`)

`bpy.ops.anim.update_data_paths()`  
Update data paths from 2.53 to edited data paths of drivers and fcurves

**File** `op/animsys_update.py:692`

## 1.2.3 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.

`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"*)

Undocumented ([contribute](#))

**Parameters**

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

`bpy.ops.armature.calculate_roll` (*type='GLOBALUP'*)

Undocumented ([contribute](#))

**Parameters**

- **type** (*enum in ['GLOBALUP', 'CURSOR'], (optional, never None)*) – Type

`bpy.ops.armature.click_extrude` ()

Undocumented ([contribute](#))

`bpy.ops.armature.delete` ()

Undocumented ([contribute](#))

`bpy.ops.armature.duplicate` ()

Undocumented ([contribute](#))

`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)
- **TRANSFORM\_OT\_translate** (*TRANSFORM\_OT\_translate, (optional)*) – Translate, Translate selected items

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

Undocumented ([contribute](#))

**Parameters**

- **forked** (*boolean, (optional)*) – Forked

`bpy.ops.armature.extrude_forked` (*ARMATURE\_OT\_extrude=None, TRANS-*  
*FORM\_OT\_translate=None*)

Undocumented ([contribute](#))

**Parameters**

- **ARMATURE\_OT\_extrude** (*ARMATURE\_OT\_extrude, (optional)*) – Extrude
- **TRANSFORM\_OT\_translate** (*TRANSFORM\_OT\_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.armature.extrude_move` (*ARMATURE\_OT\_extrude=None, TRANS-*  
*FORM\_OT\_translate=None*)

Undocumented ([contribute](#))

**Parameters**

- **ARMATURE\_OT\_extrude** (*ARMATURE\_OT\_extrude, (optional)*) – Extrude
- **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.flags_set` (*type='DRAWWIRE', mode='CLEAR'*)  
Set flags for armature bones

**Parameters**

- **type** (*enum in ['DRAWWIRE', 'DEFORM', 'MULT\_VG', 'HINGE', 'NO\_SCALE', 'LOCKED'], (optional, never None)*) – Type
- **mode** (*enum in ['CLEAR', 'ENABLE', 'TOGGLE'], (optional, never None)*) – Mode

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

`bpy.ops.armature.hide` ()  
Undocumented ([contribute](#))

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

**Parameters**

- **type** (*enum in ['WITHIN\_CHAIN'], (optional, never None)*) – Type

`bpy.ops.armature.parent_clear` (*type='CLEAR'*)  
Undocumented ([contribute](#))

**Parameters**

- **type** (*enum in ['CLEAR', 'DISCONNECT'], (optional, never None)*) – ClearType, What way to clear parenting

`bpy.ops.armature.parent_set` (*type='CONNECTED'*)  
Undocumented ([contribute](#))

**Parameters**

- **type** (*enum in ['CONNECTED', 'OFFSET'], (optional, never None)*) – ParentType, Type of parenting

`bpy.ops.armature.reveal()`  
Undocumented (contribute)

`bpy.ops.armature.select_all(action='TOGGLE')`  
Undocumented (contribute)

**Parameters**

- **action** (enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional, never None)) – Action, Selection action to execute

`bpy.ops.armature.select_hierarchy(direction='PARENT', extend=False)`  
Undocumented (contribute)

**Parameters**

- **direction** (enum in ['PARENT', 'CHILD'], (optional, never None)) – Direction
- **extend** (boolean, (optional)) – Add to Selection

`bpy.ops.armature.select_inverse()`  
Undocumented (contribute)

`bpy.ops.armature.select_linked(extend=False)`  
Undocumented (contribute)

**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)`  
Undocumented (contribute)

**Parameters**

- **number\_cuts** (int in [1, inf], (optional)) – Number of Cuts

`bpy.ops.armature.switch_direction()`  
Undocumented (contribute)

## 1.2.4 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

`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

## 1.2.5 Brush Operators

`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.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

## 1.2.6 Buttons Operators

`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=False)`

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

## 1.2.7 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** `op/presets.py:42`

## 1.2.8 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** `ui/space_console.py:145`

`bpy.ops.console.banner()`  
Print a message when the terminal initializes

**File** `ui/space_console.py:162`

`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, never None)*) – Type, Which part of the text to delete.

`bpy.ops.console.execute()`  
Execute the current console line as a python expression

**File** `ui/space_console.py:123`

`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** `ui/space_console.py:185`

`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, never None)*) – Type, Where to move cursor to.

`bpy.ops.console.paste` ()  
Paste text from clipboard

`bpy.ops.console.report_copy` ()  
Copy selected reports to Clipboard

`bpy.ops.console.report_delete` ()  
Delete selected reports

`bpy.ops.console.report_replay` ()  
Replay selected reports

`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_all_toggle()`  
(de)select all reports

`bpy.ops.console.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0)`  
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

`bpy.ops.console.select_pick(report_index=0)`  
Select reports by index

**Parameters**

- **report\_index** (*int in [0, inf], (optional)*) – Report, The index of the report.

`bpy.ops.console.select_set()`  
Set the console selection

## 1.2.9 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

`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

`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

`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

`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

`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

## 1.2.10 Curve Operators

`bpy.ops.curve.cyclic_toggle` (*direction='CYCLIC\_U'*)  
Undocumented ([contribute](#))

#### Parameters

- **direction** (*enum in ['CYCLIC\_U', 'CYCLIC\_V'], (optional, never None)*) – 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'*)  
Undocumented ([contribute](#))

#### Parameters

- **type** (*enum in ['SELECTED', 'SEGMENT', 'ALL'], (optional, never None)*) – Type, Which elements to delete.

`bpy.ops.curve.duplicate` (*mode=1*)  
Undocumented ([contribute](#))

#### Parameters

- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.curve.extrude` (*mode=1*)  
Undocumented ([contribute](#))

#### Parameters

- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.curve.handle_type_set` (*type='AUTOMATIC'*)  
Undocumented ([contribute](#))

#### Parameters

- **type** (*enum in ['AUTOMATIC', 'VECTOR', 'TOGGLE\_FREE\_ALIGN', 'ALIGN', '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)
Undocumented (contribute)
```

#### 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, never None)*) – Action, Selection action to execute

`bpy.ops.curve.select_inverse` ()  
Undocumented ([contribute](#))

`bpy.ops.curve.select_less` ()  
Undocumented ([contribute](#))

`bpy.ops.curve.select_linked` (*deselect=False, location=(0, 0)*)  
Undocumented ([contribute](#))

**Parameters**

- **deselect** (*boolean, (optional)*) – Deselect, Deselect linked control points rather than selecting them.
- **location** (*int array of 2 items in [0, inf], (optional)*) – Location

`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` ()  
Undocumented ([contribute](#))



`bpy.ops.curve.smooth_radius ()`  
Undocumented ([contribute](#))

`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')`  
Undocumented ([contribute](#))

#### Parameters

- **type** (*enum in ['POLY', 'BEZIER', 'NURBS'], (optional)*) – Type, Spline type

`bpy.ops.curve.spline_weight_set (weight=1.0)`  
Undocumented ([contribute](#))

#### Parameters

- **weight** (*float in [0, 1], (optional)*) – Weight

`bpy.ops.curve.subdivide (number_cuts=1)`  
Undocumented ([contribute](#))

#### Parameters

- **number\_cuts** (*int in [1, 100], (optional)*) – Number of cuts

`bpy.ops.curve.switch_direction ()`  
Undocumented ([contribute](#))

`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.

## 1.2.11 Ed Operators

`bpy.ops.ed.redo ()`  
Redo previous action

`bpy.ops.ed.undo ()`  
Undo previous action

## 1.2.12 Export Operators

`bpy.ops.export.ply (filepath="" , check_existing=True, 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, Exort the active UV layer
- **use\_colors** (*boolean, (optional)*) – Vertex Colors, Exort the active vertex color layer

**File** `op/io_mesh_ply/__init__.py:46`

### 1.2.13 Export\_scene Operators

`bpy.ops.export_scene.autodesk_3ds` (*filepath=""*, *check\_existing=True*)

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

**File** `op/io_scene_3ds/__init__.py:57`

`bpy.ops.export_scene.fbx` (*filepath=""*, *check\_existing=True*, *EXP\_OBS\_SELECTED=True*,  
*TX\_SCALE=1.0*, *TX\_XROT90=True*, *TX\_YROT90=False*,  
*TX\_ZROT90=False*, *EXP\_EMPTY=True*, *EXP\_CAMERA=True*,  
*EXP\_LAMP=True*, *EXP\_ARMATURE=True*, *EXP\_MESH=True*,  
*EXP\_MESH\_APPLY\_MOD=True*, *EXP\_MESH\_HQ\_NORMALS=True*,  
*EXP\_IMAGE\_COPY=False*, *ANIM\_ENABLE=True*,  
*ANIM\_OPTIMIZE=True*, *ANIM\_OPTIMIZE\_PRECISION=6.0*,  
*ANIM\_ACTION\_ALL=False*, *BATCH\_ENABLE=False*,  
*BATCH\_GROUP=False*, *BATCH\_OWN\_DIR=True*,  
*BATCH\_FILE\_PREFIX=""*)

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
- **EXP\_OBS\_SELECTED** (*boolean, (optional)*) – Selected Objects, Export selected objects on visible layers
- **TX\_SCALE** (*float in [0.01, 1000], (optional)*) – Scale, Scale all data, (Note! some imports dont support scaled armatures)
- **TX\_XROT90** (*boolean, (optional)*) – Rot X90, Rotate all objects 90 degrees about the X axis
- **TX\_YROT90** (*boolean, (optional)*) – Rot Y90, Rotate all objects 90 degrees about the Y axis

- **TX\_ZROT90** (*boolean, (optional)*) – Rot Z90, Rotate all objects 90 degrees about the Z axis
- **EXP\_EMPTY** (*boolean, (optional)*) – Empties, Export empty objects
- **EXP\_CAMERA** (*boolean, (optional)*) – Cameras, Export camera objects
- **EXP\_LAMP** (*boolean, (optional)*) – Lamps, Export lamp objects
- **EXP\_ARMATURE** (*boolean, (optional)*) – Armatures, Export armature objects
- **EXP\_MESH** (*boolean, (optional)*) – Meshes, Export mesh objects
- **EXP\_MESH\_APPLY\_MOD** (*boolean, (optional)*) – Modifiers, Apply modifiers to mesh objects
- **EXP\_MESH\_HQ\_NORMALS** (*boolean, (optional)*) – HQ Normals, Generate high quality normals
- **EXP\_IMAGE\_COPY** (*boolean, (optional)*) – Copy Image Files, Copy image files to the destination path
- **ANIM\_ENABLE** (*boolean, (optional)*) – Enable Animation, Export keyframe animation
- **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)
- **ANIM\_ACTION\_ALL** (*boolean, (optional)*) – All Actions, Use all actions for armatures, if false, use current action
- **BATCH\_ENABLE** (*boolean, (optional)*) – Enable Batch, Automate exporting multiple scenes or groups to files
- **BATCH\_GROUP** (*boolean, (optional)*) – Group > File, Export each group as an FBX file, if false, export each scene as an FBX file
- **BATCH\_OWN\_DIR** (*boolean, (optional)*) – Own Dir, Create a dir for each exported file
- **BATCH\_FILE\_PREFIX** (*string, (optional)*) – Prefix, Prefix each file with this name

File `op/io_scene_fbx/__init__.py:69`

```
bpy.ops.export_scene.obj (filepath=" ", check_existing=True, use_selection=False,
                        use_all_scenes=False, use_animation=False, use_modifiers=True,
                        use_rotate_x90=True, use_edges=True, use_normals=False,
                        use_hq_normals=True, use_uvns=True, use_materials=True,
                        copy_images=False, use_triangles=False, use_vertex_groups=False,
                        use_nurbs=False, use_blen_objects=True, group_by_object=False,
                        group_by_material=False, keep_vertex_order=False)
```

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\_all\_scenes** (*boolean, (optional)*) – All Scenes
- **use\_animation** (*boolean, (optional)*) – Animation

- **use\_modifiers** (*boolean, (optional)*) – Apply Modifiers, Apply modifiers (preview resolution)
- **use\_rotate\_x90** (*boolean, (optional)*) – Rotate X90
- **use\_edges** (*boolean, (optional)*) – Edges
- **use\_normals** (*boolean, (optional)*) – Normals
- **use\_hq\_normals** (*boolean, (optional)*) – High Quality Normals
- **use\_uv** (*boolean, (optional)*) – UVs
- **use\_materials** (*boolean, (optional)*) – Materials
- **copy\_images** (*boolean, (optional)*) – Copy Images
- **use\_triangles** (*boolean, (optional)*) – Triangulate
- **use\_vertex\_groups** (*boolean, (optional)*) – Polygroups
- **use\_nurbs** (*boolean, (optional)*) – Nurbs
- **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

**File** `op/io_scene_obj/_init__.py:115`

```
bpy.ops.export_scene.x3d(filepath="", check_existing=True, use_apply_modifiers=True,  
                        use_triangulate=False, use_compress=False)  
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\_apply\_modifiers** (*boolean, (optional)*) – Apply Modifiers, Use transformed mesh data from each object
- **use\_triangulate** (*boolean, (optional)*) – Triangulate, Triangulate quads.
- **use\_compress** (*boolean, (optional)*) – Compress, GZip the resulting file, requires a full python install

**File** `op/io_scene_x3d/_init__.py:42`

## 1.2.14 Export\_shape Operators

```
bpy.ops.export_shape.mdd(filepath="", check_existing=True, fps=25, frame_start=1,  
                        frame_end=250)  
Animated mesh to MDD vertex keyframe 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

- **fps** (*int in [1, 120], (optional)*) – Frames Per Second, Number of frames/second
- **frame\_start** (*int in [1, 300000], (optional)*) – Start Frame, Start frame for baking
- **frame\_end** (*int in [1, 300000], (optional)*) – End Frame, End frame for baking

**File** `op/io_shape_mdd/__init__.py:85`

## 1.2.15 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_new()`  
Create a 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 [0, 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*)  
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

`bpy.ops.file.select_execute` (*FILE\_OT\_select=None, FILE\_OT\_execute=None*)  
Undocumented ([contribute](#))

#### Parameters

- **FILE\_OT\_select** (*FILE\_OT\_select, (optional)*) – Activate/Select File, Activate/select file
- **FILE\_OT\_execute** (*FILE\_OT\_execute, (optional)*) – Execute File Window, Execute selected file

`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.

## 1.2.16 Fluid Operators

`bpy.ops.fluid.bake` ()  
Bake fluid simulation

## 1.2.17 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 increasing 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, never None)*) – 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, never None)) – 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, never None)) – 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*)

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.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, never None)) – 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="")`  
Insert text at cursor position

**Parameters**

- **text** (*string, (optional)*) – Text, Text to insert at the cursor position.

`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

## 1.2.18 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', 'ERASER'], (optional, never None)*) – Mode, Way to interpret mouse movements.
- **stroke** (Collection of `OperatorStrokeElement`, (optional)) – Stroke

`bpy.ops.gpencil.layer_add()`  
Add new Grease Pencil layer for the active Grease Pencil datablock

## 1.2.19 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` (*left\_right='OFF', extend=False, column=False, curves=False*)  
Select keyframes by clicking on them

#### Parameters

- **left\_right** (*enum in ['CHECK', 'OFF', 'LEFT', 'RIGHT'], (optional, never None)*) – Left Right
- **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=1*)  
Make a copy of all selected keyframes

#### Parameters

- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.graph.euler_filter` ()  
Fixes the most common causes of gimbal lock in the fcurves of the active bone

**File** `op/fcurve_euler_filter.py:55`

`bpy.ops.graph.extrapolation_type` (*type='CONSTANT'*)  
Set extrapolation mode for selected F-Curves

#### Parameters

- **type** (*enum in ['CONSTANT', 'LINEAR'], (optional, never None)*) – Type

`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, never None)*) – 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', 'ANIM\_CLAMPED'], (optional, never None)*) – Type

`bpy.ops.graph.handles_view_toggle()`  
Undocumented ([contribute](#))

`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, never None)*) – Type

`bpy.ops.graph.keyframe_insert(type='ALL')`  
Insert keyframes for the specified channels

**Parameters**

- **type** (*enum in ['ALL', 'SEL'], (optional, never None)*) – 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, never None)*) – Type

`bpy.ops.graph.paste()`  
Paste keyframes from copy/paste buffer for the selected channels, starting on the current frame

`bpy.ops.graph.previewrange_set()`  
Undocumented ([contribute](#))

`bpy.ops.graph.properties()`  
Undocumented ([contribute](#))

`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, 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
- **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, never None)*) – Mode

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

`bpy.ops.graph.select_linked` ()  
Select keyframes occurring 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, never None)*) – 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

## 1.2.20 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

## 1.2.21 Help Operators

`bpy.ops.help.operator_cheat_sheet ()`  
Undocumented (contribute)

**File** `ui/space_info.py:365`

## 1.2.22 Image Operators

`bpy.ops.image.curves_point_set (point='BLACK_POINT')`  
Undocumented (contribute)

### Parameters

- **point** (*enum in ['BLACK\_POINT', 'WHITE\_POINT'], (optional, never None)*) – Point, Set black point or white point for curves.

`bpy.ops.image.cycle_render_slot ()`  
Undocumented (contribute)

`bpy.ops.image.external_edit (filepath="" )`  
Edit image in an external application

### Parameters

- **filepath** (*string, (optional)*) – File Path, Path to an image file

**File** `op/image.py:62`

`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)`  
Undocumented (contribute)

### 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=False)`  
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.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** `op/image.py:182`

`bpy.ops.image.project_edit` ()

Edit a snapshot if the viewport in an external image editor

**File** `op/image.py:119`

`bpy.ops.image.properties` ()

Undocumented ([contribute](#))

`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=False*)

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_type='PNG', 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=False, copy=False)`  
Undocumented ([contribute](#))

#### Parameters

- **file\_type** (*enum in ['TARGA', 'TARGA RAW', 'PNG', 'BMP', 'JPEG', 'IRIS'], (optional, never None)*) – File Type, File type to save image as.
- **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** `op/image.py:96`

`bpy.ops.image.save_sequence()`  
Undocumented ([contribute](#))

`bpy.ops.image.scopes()`  
Undocumented ([contribute](#))

`bpy.ops.image.toolbox()`  
Undocumented ([contribute](#))

`bpy.ops.image.unpack(method='USE_LOCAL', image=""`)  
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.
- **image** (*string, (optional)*) – Image Name, Image datablock name to unpack.

`bpy.ops.image.view_all()`  
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.

### 1.2.23 Import\_anim Operators

```
bpy.ops.import_anim.bvh (filepath="", filter_glob="*.bvh", scale=0.1, frame_start=1,
                        use_cyclic=False, rotate_mode='NATIVE')
```

Load a OBJ Motion Capture File

#### Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **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.

**File** op/io\_anim\_bvh/\_\_init\_\_.py:58

### 1.2.24 Import\_scene Operators

```
bpy.ops.import_scene.autodesk_3ds (filepath="", filter_glob="*.3ds", constrain_size=10.0,
                                   use_image_search=True, use_apply_transform=False)
```

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

**File** op/io\_scene\_3ds/\_\_init\_\_.py:45

```
bpy.ops.import_scene.obj (filepath="", filter_glob="*.obj;*.mtl", CREATE_SMOOTH_GROUPS=True,
                          CREATE_FGONS=True, CREATE_EDGE_GROUPS=True, SPLIT_OBJECTS=True,
                          SPLIT_GROUPS=True, ROTATE_X90=True, CLAMP_SIZE=0.0, POLYGROUPS=True,
                          IMAGE_SEARCH=True)
```

Load a Wavefront OBJ File

#### Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **CREATE\_SMOOTH\_GROUPS** (*boolean, (optional)*) – Smooth Groups, Surround smooth groups by sharp edges
- **CREATE\_FGONS** (*boolean, (optional)*) – NGons as FGons, Import faces with more than 4 verts as fgons

- **CREATE\_EDGES** (*boolean, (optional)*) – Lines as Edges, Import lines and faces with 2 verts as edge
- **SPLIT\_OBJECTS** (*boolean, (optional)*) – Object, Import OBJ Objects into Blender Objects
- **SPLIT\_GROUPS** (*boolean, (optional)*) – Group, Import OBJ Groups into Blender Objects
- **ROTATE\_X90** (*boolean, (optional)*) – -X90, Rotate X 90.
- **CLAMP\_SIZE** (*float in [0, 1000], (optional)*) – Clamp Scale, Clamp the size to this maximum (Zero to Disable)
- **POLYGROUPS** (*boolean, (optional)*) – Poly Groups, Import OBJ groups as vertex groups.
- **IMAGE\_SEARCH** (*boolean, (optional)*) – Image Search, Search subdirs for any associated images (Warning, may be slow)

**File** `op/io_scene_obj/__init__.py:56`

### 1.2.25 Import\_shape Operators

`bpy.ops.import_shape.mdd` (*filepath=""*, *filter\_glob="\*.mdd"*, *frame\_start=0*, *frame\_step=1*)  
Import MDD vertex keyframe file to shape keys

#### Parameters

- **filepath** (*string, (optional)*) – File Path, Filepath used for importing the file
- **frame\_start** (*int in [-300000, 300000], (optional)*) – Start Frame, Start frame for inserting animation
- **frame\_step** (*int in [1, 1000], (optional)*) – Step

**File** `op/io_shape_mdd/__init__.py:50`

### 1.2.26 Info Operators

`bpy.ops.info.reports_display_update` ()  
Undocumented ([contribute](#))

### 1.2.27 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** `op/presets.py:42`

### 1.2.28 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, never None)*) – Action, Selection action to execute

**1.2.29 Logic Operators**

`bpy.ops.logic.actuator_add` (*type='', name=""*, *object=""*)  
Add a 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 a 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
- **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*)  
Undocumented ([contribute](#))

#### Parameters

- **path** (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 Densor

#### 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

## 1.2.30 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=""*)  
Link 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.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, never None)*) – Action, Selection action to execute

`bpy.ops.marker.select_border` (*gesture\_mode=0, xmin=0, xmax=0, ymin=0, ymax=0*)  
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

## 1.2.31 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** `op/presets.py:42`

### 1.2.32 Mball Operators

`bpy.ops.mball.delete_metaelems ()`  
Delete selected metaelement(s)

`bpy.ops.mball.duplicate_metaelems (mode=1)`  
Delete selected metaelement(s)

#### Parameters

- **mode** (*int in [0, inf], (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, never None)*) – Action, Selection action to execute

`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.

### 1.2.33 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=True)`  
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 then 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, never None)*) – 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** `op/wm.py:32`

`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*=1)  
Duplicate selected vertices, edges or faces

#### Parameters

- **mode** (*int in [0, inf], (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, 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, never None)*) – Type

`bpy.ops.mesh.extrude_edges_move` (*MESH\_OT\_extrude=None, TRANS-*  
*FORM\_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, TRANS-*  
*FORM\_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, TRANS-*  
*FORM\_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*)

Extrude selected vertices, edges or faces repeatedly

#### Parameters

- **offset** (*float in [0, 100], (optional)*) – Offset

- **steps** (*int in [0, 180], (optional)*) – Steps

`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` ()  
Copy mirror UV coordinates on the X axis based on a mirrored mesh

**File** `op/mesh.py:78`

`bpy.ops.mesh.faces_select_interior` ()  
Select faces where all edges have more then 2 face users.

**File** `op/mesh.py:36`

`bpy.ops.mesh.faces_select_linked_flat` (*sharpness=0.0*)  
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, never None)*) – Type
- **path** (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, never None)*) – Type, Merge method to use.
- **uvs** (*boolean, (optional)*) – UVs, Move UVs according to merge.

`bpy.ops.mesh.normals_make_consistent` (*inside=False*)  
Flip all selected vertex and face normals in a consistent direction

**Parameters**



**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 [-inf, 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 [-inf, inf], (optional)*) – X Subdivisions
- **y\_subdivisions** (*int in [-inf, 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 [0, 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, 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
- **location** (*float array of 3 items in [-inf, inf], (optional)*) – Location
- **rotation** (*float array of 3 items in [-inf, inf], (optional)*) – Rotation

**File** op/add\_mesh\_torus.py:109

```
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 [-inf, inf], (optional)*) – Segments
- **ring\_count** (*int in [-inf, 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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – 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, never None)*) – Action, Selection action to execute

`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 boundries (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 boundries (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'*)  
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, never None)*) – Type

`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, never None)*) – 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', 'SELECTION', 'RANDOMIZE'], (optional, never None)*) – 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_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.

## 1.2.34 Nla Operators

`bpy.ops.nla.action_sync_length` (*active=True*)

Synchronise the length of the referenced Action with the lengths 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, never None)*) – 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*)

Bake animation to an Action

### Parameters

- **frame\_start** (*int in [1, 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

**File** `op/nla.py:150`

`bpy.ops.nla.channels_click` (*extend=False*)

Undocumented (`contribute`)

### Parameters

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

`bpy.ops.nla.clear_scale` ()

Reset scaling of selected strips

`bpy.ops.nla.click_select` (*left\_right='OFF', extend=False*)

Undocumented (`contribute`)

### Parameters

- **left\_right** (*enum in ['CHECK', 'OFF', 'LEFT', 'RIGHT'], (optional, never None)*) – Left Right
- **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=1)`  
Duplicate selected NLA-Strips, adding the new strips in new tracks above the originals

**Parameters**

- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.nla.fmodifier_add(type='NULL', only_active=False)`  
Undocumented ([contribute](#))

**Parameters**

- **type** (*enum in ['NULL', 'GENERATOR', 'FNGENERATOR', 'ENVELOPE', 'CYCLES', 'NOISE', 'FILTER', 'LIMITS', 'STEPPED'], (optional, never None)*) – Type
- **only\_active** (*boolean, (optional)*) – Only Active, Only add 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-muted selected strips

`bpy.ops.nla.properties()`  
Undocumented ([contribute](#))

`bpy.ops.nla.select_all_toggle(invert=False)`  
Undocumented ([contribute](#))

**Parameters**

- **invert** (*boolean, (optional)*) – Invert

`bpy.ops.nla.select_border(gesture_mode=0, xmin=0, xmax=0, ymin=0, ymax=0, axis_range=False)`  
Undocumented ([contribute](#))

**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

- **axis\_range** (*boolean, (optional)*) – Axis Range

`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, never None*)) – Type

`bpy.ops.nla.split` ()  
Split selected strips at their midpoints

`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

## 1.2.35 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 ()`  
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.duplicate ()`  
Duplicate the 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 the 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_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** (*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.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.resize()`  
Undocumented ([contribute](#))

`bpy.ops.node.select(mouse_x=0, mouse_y=0, extend=False)`  
Undocumented ([contribute](#))

#### 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, tweak=False)`  
Undocumented ([contribute](#))

#### 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
- **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
- **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 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()`  
Undocumented ([contribute](#))

`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

## 1.2.36 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', 'TEXT', 'ARMATURE', 'LATTICE', 'EMPTY', 'CAMERA', 'LAMP'], (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` (*align\_mode='OPT\_2', relative\_to='OPT\_4', align\_x=False, align\_y=False, align\_z=False*)

Align Objects

**Parameters**

- **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\_x** (*boolean, (optional)*) – Align X, Align in the X axis
- **align\_y** (*boolean, (optional)*) – Align Y, Align in the Y axis
- **align\_z** (*boolean, (optional)*) – Align Z, Align in the Z axis

**File** `op/object_align.py:270`

`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)*)

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.armature_human_advanced_add` ()

Add an advanced human metarig base

**File** `op/add_armature_human.py:591`

`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)*)

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 ['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

`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 ['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, never None)*) – Type

`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, never None)*) – Target, Type of object to convert to.
- **keep\_original** (*boolean, (optional)*) – Keep Original, Keep original objects instead of replacing them.

`bpy.ops.object.delete` ()

Delete selected objects

`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=1*)  
Duplicate selected objects

#### Parameters

- **linked** (*boolean, (optional)*) – Linked, Duplicate object but not object data, linking to the original data.
- **mode** (*int in [0, inf], (optional)*) – Mode

`bpy.ops.object.duplicate_move` (*OBJECT\_OT\_duplicate=None, TRANS-*  
*FORM\_OT\_translate=None*)  
Undocumented ([contribute](#))

#### Parameters

- **OBJECT\_OT\_duplicate** (*OBJECT\_OT\_duplicate, (optional)*) – Duplicate, Duplicate selected objects
- **TRANSFORM\_OT\_translate** (*TRANSFORM\_OT\_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.object.duplicate_move_linked` (*OBJECT\_OT\_duplicate=None, TRANS-*  
*FORM\_OT\_translate=None*)  
Undocumented ([contribute](#))

#### Parameters

- **OBJECT\_OT\_duplicate** (*OBJECT\_OT\_duplicate, (optional)*) – Duplicate, Duplicate selected objects
- **TRANSFORM\_OT\_translate** (*TRANSFORM\_OT\_translate, (optional)*) – Translate, Translate selected items

`bpy.ops.object.duplicates_make_real` ()  
Make dupli objects attached to this object real

`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.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` ()  
Undocumented ([contribute](#))

`bpy.ops.object.game_property_remove` (*index=0*)  
Undocumented ([contribute](#))

**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** `op/object.py:561`

`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=''*)  
Selects effected 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** `op/object.py:540`

`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` (`op/object.py:461`)  
Copy UV Layout to objects with matching geometry

**File** `op/object.py:461`

`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
- **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_apply` (`op/object.py:529`)  
Apply the object's location to its data

`bpy.ops.object.location_clear` (`op/object.py:529`)  
Clear the object's location

`bpy.ops.object.logic_bricks_copy` (`op/object.py:529`)  
Copy logic bricks to other selected objects.

`bpy.ops.object.make_dupli_face` (`op/object.py:529`)  
Make linked objects into dupli-faces

**File** `op/object.py:529`

`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=''`)  
Make linked data local to each object

**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, never None)*) – 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)*) – Animation Data, Make animation data local to each object

`bpy.ops.object.material_slot_add` ()

Add a new material slot or duplicate the selected one

`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*='MBALL\_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 ['MBALL\_BALL', 'MBALL\_CAPSULE', 'MBALL\_PLANE', 'MBALL\_CUBE', 'MBALL\_ELLIPSOID'], (optional, never None)*) – 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, never None)*) – Mode
- **toggle** (*boolean, (optional)*) – Toggle

`bpy.ops.object.modifier_add` (*type='SUBSURF'*)  
Add a modifier to the active object

#### Parameters

- **type** (*enum in ['ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE\_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SOLIDIFY', 'SUBSURF', 'UV\_PROJECT', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH\_DEFORM', 'SHRINKWRAP', 'SIMPLE\_DEFORM', 'SMOOTH', 'WAVE', 'CLOTH', 'COLLISION', 'EXPLODE', 'FLUID\_SIMULATION', '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
- **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, False, False, False,
False))
```

Move the object to different layers

**Parameters**

- **layers** (*boolean array of 20 items, (optional)*) – Layer

```
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=False, 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="")
```

Undocumented ([contribute](#))

**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.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, never None)*) – Type
- **center** (*enum in ['MEDIAN', 'BOUNDS'], (optional, never None)*) – Center

`bpy.ops.object.parent_clear` (*type='CLEAR'*)  
Clear the object's parenting

**Parameters**

- **type** (*enum in ['CLEAR', 'CLEAR\_KEEP\_TRANSFORM', 'CLEAR\_INVERSE'], (optional, never None)*) – 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, never None)*) – 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` ()  
Enables or disables 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, never None)*) – Type, Group object

`bpy.ops.object.randomize_transform` (*random\_seed=0, 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\_min=0.15, 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\_loc** (*boolean, (optional)*) – Randomize Location, Randomize the scale 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\_min** (*float in [-1, 1], (optional)*) – Minimum Scale Factor, Lowest scale percentage possible
- **scale** (*float array of 3 items in [-100, 100], (optional)*) – Scale, Maximum scale randomization over each axis

**File** `op/object_randomize_transform.py:120`

`bpy.ops.object.rotation_apply` ()  
Apply the object's rotation to its data

`bpy.ops.object.rotation_clear` ()  
Clear the object's rotation

`bpy.ops.object.scale_apply` ()  
Apply the object's scale to its data

`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, never None)*) – Action, Selection action to execute

`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', 'TEXT', 'ARMATURE', 'LATTICE', 'EMPTY', 'CAMERA', 'LAMP'], (optional)*) – Type

`bpy.ops.object.select_camera` ()  
Select object matching a naming pattern

**File** `op/object.py:86`

`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'], (optional, never None)*) – Type

`bpy.ops.object.select_hierarchy` (*direction='PARENT', extend=False*)  
Select object relative to the active objects position in the hierarchy

**Parameters**

- **direction** (*enum in ['PARENT', 'CHILD'], (optional, never None)*) – Direction, Direction to select in the hierarchy
- **extend** (*boolean, (optional)*) – Extend, Extend the existing selection

**File** `op/object.py:116`

`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, never None)*) – 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** `op/object.py:35`

`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` ()  
Undocumented ([contribute](#))

`bpy.ops.object.shade_smooth` ()  
Undocumented ([contribute](#))

`bpy.ops.object.shape_key_add` (*from\_mix=True*)  
Undocumented ([contribute](#))

#### 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` ()  
Undocumented ([contribute](#))

`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, Method to apply relative shape positions to the new shape
- **use\_clamp** (*boolean, (optional)*) – Clamp Offset, Clamp the transformation to the distance each vertex moves in the original shape.

**File** `op/object.py:387`

`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.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

**File** `op/object.py:175`

`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))`  
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, never None)*) – 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, never None)*) – Type

`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_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_mirror` (*mirror\_weights=True, flip\_group\_names=True*)  
Mirror weights, and flip vertex group names, copying when only one side is selected

#### Parameters

- **mirror\_weights** (*boolean, (optional)*) – Mirror Weights, Mirror weights.
- **flip\_group\_names** (*boolean, (optional)*) – Flip Groups, Flip vertex group names while mirroring.

`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

## 1.2.37 Outliner Operators

`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'], (optional)) – Group Operation

`bpy.ops.outliner.id_operation(type='UNLINK')`  
Undocumented (contribute)

#### Parameters

- **type** (enum in ['UNLINK', 'LOCAL'], (optional)) – ID data Operation

`bpy.ops.outliner.item_activate(extend=True)`  
Undocumented (contribute)

#### Parameters

- **extend** (boolean, (optional)) – Extend, Extend selection for activation.

`bpy.ops.outliner.item_openclose(all=True)`  
Undocumented (contribute)

#### Parameters

- **all** (boolean, (optional)) – All, Close or open all items.

`bpy.ops.outliner.item_rename()`  
Undocumented (contribute)

`bpy.ops.outliner.keyingset_add_selected()`  
Undocumented (contribute)

`bpy.ops.outliner.keyingset_remove_selected()`  
Undocumented (contribute)

`bpy.ops.outliner.object_operation(type='SELECT')`  
Undocumented (contribute)

#### Parameters

- **type** (enum in ['SELECT', 'DESELECT', 'DELETE', 'TOGVIS', 'TOGSEL', 'TOGREN'], (optional)) – Object Operation

`bpy.ops.outliner.operation()`  
Undocumented (contribute)

`bpy.ops.outliner.renderability_toggle()`  
Toggle the renderability of selected items

`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*)  
Undocumented (contribute)

**Parameters**

- **open** (*boolean, (optional)*) – Open, Expand all entries one level deep.

`bpy.ops.outliner.visibility_toggle` ()  
Toggle the visibility of selected items

## 1.2.38 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, never None)*) – Action, Selection action to execute

`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.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** (Collection of `OperatorStrokeElement`, (optional)) – Stroke

`bpy.ops.paint.image_paint_radial_control` (*initial\_value=0.0, new\_value=0.0, mode='SIZE',  
initial\_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5),  
texture\_color=(1.0, 1.0, 1.0, 1.0)*)  
Undocumented (contribute)

**Parameters**

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode
- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`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_radial_control` (*initial\_value=0.0, new\_value=0.0, mode='SIZE', initial\_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5), texture\_color=(1.0, 1.0, 1.0, 1.0)*)

Undocumented ([contribute](#))

**Parameters**

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode
- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`bpy.ops.paint.texture_paint_toggle` ()

Undocumented ([contribute](#))

`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 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 then 90 limits the angle used in the tonal range
- **dirt\_only** (*boolean, (optional)*) – Dirt Only, Dont calculate cleans for convex areas

**File** `op/vertexpaint_dirt.py:164`

`bpy.ops.paint.vertex_color_set()`  
Undocumented ([contribute](#))

`bpy.ops.paint.vertex_paint(stroke=None)`  
Undocumented ([contribute](#))

#### Parameters

- **stroke** (Collection of `OperatorStrokeElement`, (optional)) – Stroke

`bpy.ops.paint.vertex_paint_radial_control(initial_value=0.0, new_value=0.0, mode='SIZE', initial_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5), texture_color=(1.0, 1.0, 1.0, 1.0))`  
Undocumented ([contribute](#))

#### Parameters

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode
- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`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, never None)*) – Type, Method to use for assigning weights.

`bpy.ops.paint.weight_paint(stroke=None)`  
Undocumented ([contribute](#))

#### Parameters

- **stroke** (Collection of `OperatorStrokeElement`, (optional)) – Stroke

`bpy.ops.paint.weight_paint_radial_control(initial_value=0.0, new_value=0.0, mode='SIZE', initial_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5), texture_color=(1.0, 1.0, 1.0, 1.0))`  
Undocumented ([contribute](#))

#### Parameters

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode

- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`bpy.ops.paint.weight_paint_toggle()`  
Undocumented (contribute)

`bpy.ops.paint.weight_set()`  
Undocumented (contribute)

### 1.2.39 Particle Operators

`bpy.ops.particle.brush_edit(stroke=None)`  
Undocumented (contribute)

#### Parameters

- **stroke** (Collection of `OperatorStrokeElement`, (optional)) – Stroke

`bpy.ops.particle.brush_radial_control(initial_value=0.0, new_value=0.0, mode='SIZE', initial_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5), texture_color=(1.0, 1.0, 1.0, 1.0))`

Undocumented (contribute)

#### Parameters

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode
- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`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, never None)*) – 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.dupliob_copy()`  
Duplicate the current dupliobject

`bpy.ops.particle.dupliob_move_down()`  
Move dupli object down in the list

`bpy.ops.particle.dupliob_move_up()`  
Move dupli object up in the list

`bpy.ops.particle.dupliob_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, never None)*) – Action, Selection action to execute

`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

## 1.2.40 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.

`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 ['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

`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 ['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, never None)*) – Type

`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.flags_set (type='DRAWWIRE', mode='CLEAR')`

Set flags for armature bones

**Parameters**

- **type** (*enum in ['DRAWWIRE', 'DEFORM', 'MULT\_VG', 'HINGE', 'NO\_SCALE', 'LOCKED'], (optional, never None)*) – Type
- **mode** (*enum in ['CLEAR', 'ENABLE', 'TOGGLE'], (optional, never None)*) – Mode

`bpy.ops.pose.flip_names()`  
Flips (and corrects) 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_remove()`  
Removes the active bone group

`bpy.ops.pose.group_select()`  
Select bones in active Bone Group

`bpy.ops.pose.group_unassign()`  
Remove selected bones from all bone groups

`bpy.ops.pose.hide(unselected=False)`  
Undocumented ([contribute](#))

#### 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()`  
Undocumented ([contribute](#))

`bpy.ops.pose.metarig_assign()`  
Assign to the active posebone

**File** [ui/properties\\_data\\_armature\\_rigify.py:278](#)

`bpy.ops.pose.metarig_clear()`  
Clear type from the active posebone

**File** [ui/properties\\_data\\_armature\\_rigify.py:297](#)

`bpy.ops.pose.metarig_generate()`  
Generates a metarig from the active armature

**File** [ui/properties\\_data\\_armature\\_rigify.py:149](#)

`bpy.ops.pose.metarig_graph()`  
Create a graph from the active armature through graphviz

**File** [ui/properties\\_data\\_armature\\_rigify.py:208](#)

`bpy.ops.pose.metarig_reload()`  
Re-Scan the metarig package directory for scripts

**File** `ui/properties_data_armature_rigify.py:116`

`bpy.ops.pose.metarig_sample_add(metarig_type="")`  
Create a sample metarig to be modified before generating the final rig.

**Parameters**

- **metarig\_type** (*string, (optional)*) – Type, Name of the rig type to generate a sample of, a blank string for all

**File** `ui/properties_data_armature_rigify.py:187`

`bpy.ops.pose.metarig_to_script(filepath="")`  
Write the edit armature out as a python script

**Parameters**

- **filepath** (*string, (optional)*) – File Path, File path used for exporting the Armature file

**File** `ui/properties_data_armature_rigify.py:245`

`bpy.ops.pose.metarig_validate()`  
Validate a metarig from the active armature

**File** `ui/properties_data_armature_rigify.py:169`

`bpy.ops.pose.paste(flipped=False)`  
Pastesthe stored pose on to the current pose

**Parameters**

- **flipped** (*boolean, (optional)*) – Flipped on X-Axis

`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.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()`  
Undocumented (contribute)

`bpy.ops.pose.rot_clear()`  
Undocumented (contribute)

`bpy.ops.pose.scale_clear()`  
Undocumented (contribute)

`bpy.ops.pose.select_all(action='TOGGLE')`  
Undocumented (contribute)

#### Parameters

- **action** (*enum in ['TOGGLE', 'SELECT', 'DESELECT', 'INVERT'], (optional, never None)*) – Action, Selection action to execute

`bpy.ops.pose.select_constraint_target()`  
Undocumented (contribute)

`bpy.ops.pose.select_grouped(extend=False, type='LAYER')`  
Select all visible bones grouped by various properties

#### Parameters

- **extend** (*boolean, (optional)*) – Extend, Extend selection instead of deselecting everything first.
- **type** (*enum in ['LAYER', 'GROUP'], (optional, never None)*) – Type

`bpy.ops.pose.select_hierarchy(direction='PARENT', extend=False)`  
Undocumented (contribute)

#### Parameters

- **direction** (*enum in ['PARENT', 'CHILD'], (optional, never None)*) – Direction
- **extend** (*boolean, (optional)*) – Add to Selection

`bpy.ops.pose.select_inverse()`  
Undocumented (contribute)

`bpy.ops.pose.select_linked(extend=False)`  
Undocumented (contribute)

#### Parameters

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

`bpy.ops.pose.select_parent()`  
Undocumented (contribute)

`bpy.ops.pose.visual_transform_apply()`  
Apply final constrained position of pose bones to their transform.

## 1.2.41 Poselib Operators

`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.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, never None)*) – Pose, The pose to remove

`bpy.ops.poselib.pose_rename` (*pose='', name="RenamedPose"*)  
Rename nth pose from the active Pose Library

### Parameters

- **pose** (*enum in ['DEFAULT'], (optional, never None)*) – Pose, The pose to rename
- **name** (*string, (optional)*) – New Pose Name, New name for pose

## 1.2.42 Ptcache Operators

`bpy.ops.ptcache.add` ()  
Undocumented (contribute)

`bpy.ops.ptcache.bake` (*bake=False*)  
Undocumented (contribute)

### Parameters

- **bake** (*boolean, (optional)*) – Bake

`bpy.ops.ptcache.bake_all` (*bake=True*)  
Undocumented (contribute)

### Parameters

- **bake** (*boolean, (optional)*) – Bake

`bpy.ops.ptcache.bake_from_cache` ()  
Undocumented (contribute)

`bpy.ops.ptcache.free_bake` ()  
Undocumented (contribute)

`bpy.ops.ptcache.free_bake_all` ()  
Undocumented (contribute)

`bpy.ops.ptcache.remove()`  
Undocumented (contribute)

## 1.2.43 Render Operators

`bpy.ops.render.netclientanim()`  
Start rendering an animation on network

**File** `io/netrender/operators.py:97`

`bpy.ops.render.netclientblacklistslave()`  
Operator documentation text, will be used for the operator tooltip and python docs.

**File** `io/netrender/operators.py:242`

`bpy.ops.render.netclientcancel()`  
Cancel the selected network rendering job.

**File** `io/netrender/operators.py:350`

`bpy.ops.render.netclientcancelall()`  
Cancel all running network rendering jobs.

**File** `io/netrender/operators.py:379`

`bpy.ops.render.netclientdownload()`  
Download render results from the network

**File** `io/netrender/operators.py:408`

`bpy.ops.render.netclientscan()`  
Listen on network for master server broadcasting its address and port.

**File** `io/netrender/operators.py:450`

`bpy.ops.render.netclientsend()`  
Send Render Job to the Network

**File** `io/netrender/operators.py:141`

`bpy.ops.render.netclientsendframe()`  
Send Render Job with current frame to the Network

**File** `io/netrender/operators.py:171`

`bpy.ops.render.netclientslaves()`  
Refresh status about available Render slaves

**File** `io/netrender/operators.py:303`

`bpy.ops.render.netclientstart()`  
Start network rendering service

**File** `io/netrender/operators.py:124`

`bpy.ops.render.netclientstatus()`  
Refresh the status of the current jobs

**File** `io/netrender/operators.py:201`

`bpy.ops.render.netclientweb()`  
Open new window with information about running rendering jobs

**File** `io/netrender/operators.py:474`

`bpy.ops.render.netclientwhitelistslave()`

Operator documentation text, will be used for the operator tooltip and python docs.

**File** `io/netrender/operators.py:272`

`bpy.ops.render.netslavebake()`

NEED DESCRIPTION

**File** `io/netrender/operators.py:39`

`bpy.ops.render.opengl(animation=False, view_context=True)`

OpenGL render active viewport

**Parameters**

- **animation** (*boolean, (optional)*) – Animation
- **view\_context** (*boolean, (optional)*) – View Context, Use the current 3D view for rendering, else use scene settings.

`bpy.ops.render.play_rendered_anim()`

Plays back rendered frames/movies using an external player.

**File** `op/screen_play_rendered_anim.py:76`

`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** `op/presets.py:42`

`bpy.ops.render.render(animation=False, layer="", scene="")`

Render active scene

**Parameters**

- **animation** (*boolean, (optional)*) – Animation
- **layer** (*string, (optional)*) – Render Layer, Single render layer to re-render
- **scene** (*string, (optional)*) – Scene, Re-render single layer in this scene

`bpy.ops.render.view_cancel()`

Cancel show render view

`bpy.ops.render.view_show()`

Toggle show render view

## 1.2.44 Scene Operators

`bpy.ops.scene.delete()`

Delete active scene

`bpy.ops.scene.new(type='EMPTY')`

Add new scene by type

**Parameters**

- **type** (*enum in ['EMPTY', 'LINK\_OBJECTS', 'LINK\_OBJECT\_DATA', 'FULL\_COPY'], (optional)*) – Type



`bpy.ops.scene.render_layer_add()`  
Add a render layer

`bpy.ops.scene.render_layer_remove()`  
Remove the selected render layer

## 1.2.45 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()`  
Cancel animation, returning to the original frame

`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_split(direction='HORIZONTAL', factor=0.5)`  
Split selected area into new windows

### Parameters

- **direction** (*enum in ['HORIZONTAL', 'VERTICAL'], (optional, never None)*) – Direction
- **factor** (*float in [0, 1], (optional)*) – Factor

`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.userpref_show` ()  
Show/hide user preferences

## 1.2.46 Script Operators

`bpy.ops.script.execute_preset` (*filepath=""*, *menu\_idname=""*)  
Executes 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** `op/presets.py:130`

`bpy.ops.script.python_file_run(filepath=""`)  
Run Python file

**Parameters**

- **filepath** (*string, (optional)*) – Path

`bpy.ops.script.reload()`  
Reload Scripts

## 1.2.47 Sculpt Operators

`bpy.ops.sculpt.brush_stroke(stroke=None, mode='NORMAL', ignore_background_click=False)`  
Undocumented ([contribute](#))

**Parameters**

- **stroke** (Collection of `OperatorStrokeElement`, (optional)) – Stroke
- **mode** (*enum in ['NORMAL', 'INVERT', 'SMOOTH'], (optional, never None)*) – Sculpt Stroke Mode, Action taken when a sculpt stroke is made
- **ignore\_background\_click** (*boolean, (optional)*) – Ignore Background Click, Clicks on the background do not start the stroke

`bpy.ops.sculpt.radial_control(initial_value=0.0, new_value=0.0, mode='SIZE', initial_mouse=(0, 0), color=(1.0, 1.0, 1.0, 0.5), texture_color=(1.0, 1.0, 1.0, 1.0))`

Undocumented ([contribute](#))

**Parameters**

- **initial\_value** (*float in [0, inf], (optional)*) – Initial Value
- **new\_value** (*float in [0, inf], (optional)*) – New Value
- **mode** (*enum in ['SIZE', 'STRENGTH', 'ANGLE'], (optional, never None)*) – Mode
- **initial\_mouse** (*int array of 2 items in [-inf, inf], (optional)*) – Initial Mouse
- **color** (*float array of 4 items in [0, inf], (optional)*) – Color, Radial control color
- **texture\_color** (*float array of 4 items in [0, inf], (optional)*) – Texture Color, Radial control texture color

`bpy.ops.sculpt.sculptmode_toggle()`  
Undocumented ([contribute](#))

`bpy.ops.sculpt.set_persistent_base()`  
Undocumented ([contribute](#))

## 1.2.48 Sequencer Operators

`bpy.ops.sequencer.copy()`  
Undocumented ([contribute](#))

`bpy.ops.sequencer.crossfade_sounds()`  
Do crossfading volume animation of two selected sound strips.

**File** `op/sequencer.py:40`

`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, never None)*) – Type, The type of cut operation to perform on strips
- **side** (*enum in ['LEFT', 'RIGHT', 'BOTH'], (optional, never None)*) – 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** `op/sequencer.py:94`

`bpy.ops.sequencer.deinterlace_selected_movies` ()

Deinterlace all selected movie sources.

**File** `op/sequencer.py:129`

`bpy.ops.sequencer.delete` ()

Erase selected strips from the sequencer

`bpy.ops.sequencer.duplicate` (*mode=1*)

Duplicate the selected strips

#### Parameters

- **mode** (*int in [0, inf], (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=False*, *frame\_start=0*, *frame\_end=0*, *channel=1*, *replace\_sel=True*, *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
- **type** (*enum in ['CROSS', 'ADD', 'SUBTRACT', 'ALPHA\_OVER', 'ALPHA\_UNDER', 'GAMMA\_CROSS', 'MULTIPLY', 'OVER\_DROP', 'PLUGIN', 'WIPE', 'GLOW', 'TRANSFORM', 'COLOR', 'SPEED', 'MULTICAM'], (optional)*) – Type, Sequencer effect type
- **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="", 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=False, frame_start=0, frame_end=0, channel=1, replace_sel=True, files=None)
```

Add an image or image sequence to the sequencer

#### 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
- **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
- **files** (*Collection of OperatorFileListElement, (optional)*) – Files

`bpy.ops.sequencer.images_separate` (*length=1*)

On image sequences strips, it return 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=""*, *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=False*, *frame\_start=0*, *channel=1*, *replace\_sel=True*, *files=None*, *sound=True*)

Add a movie strip to the sequencer

#### 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
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace\_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **files** (Collection of `OperatorFileListElement`, (*optional*)) – Files
- **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.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 effects strip

`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, 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
- **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 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*)  
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.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=""*, *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=False*, *frame\_start=0*, *channel=1*, *replace\_sel=True*, *files=None*, *cache=False*)

Add a sound strip to the sequencer

#### 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
- **channel** (*int in [1, 32], (optional)*) – Channel, Channel to place this strip into
- **replace\_sel** (*boolean, (optional)*) – Replace Selection, replace the current selection
- **files** (Collection of `OperatorFileListElement`, (*optional*)) – Files
- **cache** (*boolean, (optional)*) – Cache, Cache the sound in memory.

`bpy.ops.sequencer.swap` (*side='RIGHT'*)  
Swap active strip with strip to the left

#### Parameters

- **side** (*enum in ['LEFT', 'RIGHT'], (optional, never None)*) – Side, Side of the strip to swap

`bpy.ops.sequencer.swap_data` ()  
Swap 2 sequencer strips

`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

- **y**max (*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)`  
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.

## 1.2.49 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](#))

## 1.2.50 Sound Operators

`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, relative_path=False, cache=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.

`bpy.ops.sound.pack()`  
Pack the sound into the current blend file

`bpy.ops.sound.unpack(method='USE_LOCAL')`  
Unpack the sound to the samples filename

**Parameters**

- **method** (*enum in ['USE\_LOCAL', 'WRITE\_LOCAL', 'USE\_ORIGINAL', 'WRITE\_ORIGINAL'], (optional)*) – Method, How to unpack.

## 1.2.51 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)*)

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, 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, 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 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,          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 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,          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 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, 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

## 1.2.52 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(select=False)`  
Set cursor selection

### Parameters

- **select** (*boolean, (optional)*) – Select, Set selection end rather than cursor.

`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, never None)*) – 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, never None)*) – 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, never None)*) – 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 different 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.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

### 1.2.53 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(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=False)`

Save the current generated Environment map to an image 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

`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

## 1.2.54 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

## 1.2.55 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
- **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)*, *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, never None)*) – 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.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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – Orientation, Transformation orientation
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, 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
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional)*) – 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), *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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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.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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional, never None)*) – Proportional Editing

- **proportional\_edit\_falloff** (enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (float in [0, inf], (optional)) – Proportional Size
- **snap** (boolean, (optional)) – Use Snapping Options
- **snap\_target** (enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)) – 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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)) – 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, never None)) – 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, never None)) – Proportional Editing

- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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, never None)*) – Type, Set the snap element type



`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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – Orientation, Transformation orientation
- **mirror** (*boolean, (optional)*) – Mirror Editing
- **proportional** (*enum in ['DISABLED', 'ENABLED', 'CONNECTED'], (optional, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options

- **snap\_target** (enum in [*'CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'*], (optional, never None)) – 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
- **proportional\_edit\_falloff** (enum in [*'SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'*], (optional)) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (float in [*0, inf*], (optional)) – Proportional Size
- **snap** (boolean, (optional)) – Use Snapping Options
- **snap\_target** (enum in [*'CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'*], (optional)) – 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='DUMMY', 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), re-
                             lease_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'*], (optional)) – Mode

`'TIME_SCALE', 'TIME_EXTEND', 'BAKE_TIME', 'BEVEL', 'BWEIGHT', 'ALIGN', 'EDGESLIDE', 'SEQSLIDE']`, (optional, never None) – 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 `['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW']`, (optional, never None)) – Orientation, Transformation orientation
- **mirror** (boolean, (optional)) – Mirror Editing
- **proportional** (enum in `['DISABLED', 'ENABLED', 'CONNECTED']`, (optional, never None)) – Proportional Editing
- **proportional\_edit\_falloff** (enum in `['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM']`, (optional, never None)) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (float in  $[0, inf]$ , (optional)) – Proportional Size
- **snap** (boolean, (optional)) – Use Snapping Options
- **snap\_target** (enum in `['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE']`, (optional, never None)) – 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)`, `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 `['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW']`, (optional, never None)) – Orientation, Transformation orientation
- **mirror** (boolean, (optional)) – Mirror Editing
- **proportional** (enum in `['DISABLED', 'ENABLED', 'CONNECTED']`, (optional, never None)) – Proportional Editing
- **proportional\_edit\_falloff** (enum in `['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM']`, (optional, never None)) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (float in  $[0, inf]$ , (optional)) – Proportional Size

- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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.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, never None)*) – Proportional Editing
- **proportional\_edit\_falloff** (*enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], (optional, never None)*) – Proportional Editing Falloff, Falloff type for proportional editing mode.
- **proportional\_size** (*float in [0, inf], (optional)*) – Proportional Size
- **snap** (*boolean, (optional)*) – Use Snapping Options
- **snap\_target** (*enum in ['CLOSEST', 'CENTER', 'MEDIAN', 'ACTIVE'], (optional, never None)*) – 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

## 1.2.56 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.eyedropper ()  
Sample a color from the Blender Window to store in a property
```

`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

## 1.2.57 Uv Operators

`bpy.ops.uv.align` (*axis='ALIGN\_AUTO'*)  
Align selected UV vertices to an axis

#### Parameters

- **axis** (*enum in ['ALIGN\_AUTO', 'ALIGN\_X', 'ALIGN\_Y'], (optional)*) – Axis, Axis to align UV locations on.

`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 UV's 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 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.
- **align** (*enum in ['POLAR\_ZX', 'POLAR\_ZY'], (optional)*) – Align, How to determine rotation around the pole.
- **radius** (*float in [0, inf], (optional)*) – Radius, Radius of the sphere or cylinder.
- **correct\_aspect** (*boolean, (optional)*) – Correct Aspect, Map UV's 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)*)

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 UV's, Export all UVs in this mesh (not just the visible ones)
- **mode** (*enum in ['SVG', 'EPS', 'PNG'], (optional)*) – Format, File format to export the UV layout to
- **size** (*int array of 2 items in [8, 32768], (optional)*) – Dimensions of the exported file

**File** `op/uv.py:317`

`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

**File** `op/uvcalc_follow_active.py:255`

`bpy.ops.uv.hide` (*unselected=False*)

Hide (un)selected UV vertices

**Parameters**

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

`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` ()

Undocumented (contribute)

`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 UV's 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 vertice

#### 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, never None)*) – Action, Selection action to execute

`bpy.ops.uv.select_border` (*pinned=False, gesture\_mode=0, xmin=0, xmax=0, ymin=0, ymax=0*)

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

`bpy.ops.uv.select_inverse()`  
Select inverse of (un)selected UV vertices

`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)`  
This script projection unwraps the selected faces of a mesh. it operates on all selected mesh objects, and can be used 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.

**File** `op/uvcalc_smart_project.py:1131`

`bpy.ops.uv.snap_cursor(target='PIXELS')`  
Snap cursor to target type

#### Parameters

- **target** (*enum in ['PIXELS', 'SELECTION'], (optional)*) – Target, Target to snap the selected UV's to.

`bpy.ops.uv.snap_selection(target='PIXELS')`  
Snap selected UV vertices to target type

#### Parameters



- **target** (*enum in ['PIXELS', 'CURSOR', 'ADJACENT\_UNSELECTED'], (optional)*) – Target, Target to snap the selected UV's 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.
- **align** (*enum in ['POLAR\_ZX', 'POLAR\_ZY'], (optional)*) – Align, How to determine rotation around the pole.
- **correct\_aspect** (*boolean, (optional)*) – Correct Aspect, Map UV's 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_selection` ()

Unlink selected UV vertices from active UV map

`bpy.ops.uv.unwrap` (*method='ANGLE\_BASED', fill\_holes=True, correct\_aspect=True*)

Undocumented ([contribute](#))

#### Parameters

- **method** (*enum in ['ANGLE\_BASED', 'CONFORMAL'], (optional, never None)*) – 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 UV's taking image aspect ratio into account.

`bpy.ops.uv.weld` ()

Weld selected UV vertices together

## 1.2.58 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*)

Scroll the view down

### Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y

`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*)

Scroll the view up

### Parameters

- **deltax** (*int in [-inf, inf], (optional)*) – Delta X
- **deltay** (*int in [-inf, inf], (optional)*) – Delta Y

`bpy.ops.view2d.scroller_activate` ()

Scroll view by mouse click and drag

`bpy.ops.view2d.zoom` (*deltax=0.0, deltay=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

## 1.2.59 View3d Operators

`bpy.ops.view3d.add_background_image` (*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.camera_to_view` ()  
Set camera view to active view

`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.edit_mesh_extrude_individual_move` ()  
Extrude individual elements and move

**File** `ui/space_view3d.py:1433`

`bpy.ops.view3d.edit_mesh_extrude_move_normal` ()  
Extrude and move along normals

**File** `ui/space_view3d.py:1459`

`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 ['GLOBAL', 'NORMAL', 'GIMBAL', 'LOCAL', 'VIEW'], (optional, never None)*) – 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.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.remove_background_image` (*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.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)`

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 (object mode only).
- **enumerate** (*boolean, (optional)*) – Enumerate, List objects under the mouse (object mode 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)`

Select items using lasso selection

#### Parameters

- **path** (Collection of `OperatorMousePath`, (optional)) – Path
- **deselect** (*boolean, (optional)*) – Deselect, Deselect rather than select items.

`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()`  
Centers 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, never None)*) – Orbit, Direction of View Orbit

`bpy.ops.view3d.view_pan(type='PANLEFT')`  
Pan the view

**Parameters**

- **type** (*enum in ['PANLEFT', 'PANRIGHT', 'PANUP', 'PANDOWN'], (optional, never None)*) – Pan, Direction of View Pan

`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, never None)*) – View, The Type of view
- **align\_active** (*boolean, (optional)*) – Align Active, Align to the active objects 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

## 1.2.60 Wm Operators

`bpy.ops.wm.addon_disable` (*module=""*)  
Disable an addon

#### Parameters

- **module** (*string, (optional)*) – Module, Module name of the addon to disable

**File** `ui/space_userpref.py:1081`

`bpy.ops.wm.addon_enable` (*module=""*)  
Enable an addon

#### Parameters

- **module** (*string, (optional)*) – Module, Module name of the addon to enable

**File** `ui/space_userpref.py:1060`

`bpy.ops.wm.addon_expand` (*module=""*)  
Display more information on this add-on

#### Parameters

- **module** (*string, (optional)*) – Module, Module name of the addon to expand

**File** `ui/space_userpref.py:1184`

`bpy.ops.wm.addon_install` (*module="", filepath="", filter\_folder=True, filter\_python=True, filter\_glob="\*.py;\*.zip"*)  
Install an addon

#### Parameters

- **module** (*string, (optional)*) – Module, Module name of the addon to disable
- **filepath** (*string, (optional)*) – File Path, File path to write file to
- **filter\_folder** (*boolean, (optional)*) – Filter folders
- **filter\_python** (*boolean, (optional)*) – Filter python

**File** [ui/space\\_userpref.py:1098](#)

`bpy.ops.wm.call_menu` (*name=""*)  
Undocumented ([contribute](#))

**Parameters**

- **name** (*string, (optional)*) – Name, Name of the menu

`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** [op/wm.py:340](#)

`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** [op/wm.py:287](#)

`bpy.ops.wm.context_cycle_int` (*data\_path=""*, *reverse=False*)

**Set a context value.** Useful for cycling active material, vertex keys, groups' etc.

**Parameters**

- **data\_path** (*string, (optional)*) – Context Attributes, rna context string
- **reverse** (*boolean, (optional)*) – Reverse, Cycle backwards

**File** [op/wm.py:253](#)

`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** [op/wm.py:470](#)

`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** `op/wm.py:115`

`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** `op/wm.py:65`

`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** `op/wm.py:65`

`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** `op/wm.py:65`

`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** `op/wm.py:368`

`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** `op/wm.py:65`

`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** `op/wm.py:65`

`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** `op/wm.py:191`

`bpy.ops.wm.context_toggle` (*data\_path=""*)  
Toggle a context value.

**Parameters**

- **data\_path** (*string, (optional)*) – Context Attributes, rna context string

**File** `op/wm.py:206`

`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** `op/wm.py:230`

`bpy.ops.wm.debug_menu` (*debugval=0*)  
Open a popup to set the debug level

**Parameters**

- **debugval** (*int in [-10000, 10000], (optional)*) – Debug Value

`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** `op/wm.py:592`

`bpy.ops.wm.doc_view` (*doc\_id=""*)  
Load online reference docs

**Parameters**

- **doc\_id** (*string, (optional)*) – Doc ID

**File** [op/wm.py:547](#)

`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** [op/presets.py:42](#)

`bpy.ops.wm.keyconfig_activate` (*filepath=""*)  
Undocumented ([contribute](#))

**Parameters**

- **filepath** (*string, (optional)*) – File Path

**File** [op/wm.py:778](#)

`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** [ui/space\\_userpref\\_keymap.py:594](#)

`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** [ui/space\\_userpref\\_keymap.py:545](#)

`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** [op/presets.py:42](#)

`bpy.ops.wm.keyconfig_remove` ()  
Remove key config

**File** [ui/space\\_userpref\\_keymap.py:770](#)

`bpy.ops.wm.keyconfig_test()`  
Test keyconfig for conflicts

**File** `ui/space_userpref_keymap.py:512`

`bpy.ops.wm.keyitem_add()`  
Add key map item

**File** `ui/space_userpref_keymap.py:726`

`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** `ui/space_userpref_keymap.py:752`

`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** `ui/space_userpref_keymap.py:711`

`bpy.ops.wm.keymap_edit()`  
Edit stored key map

**File** `ui/space_userpref_keymap.py:677`

`bpy.ops.wm.keymap_restore(all=False)`  
Restore key map(s)

**Parameters**

- **all** (*boolean, (optional)*) – All Keymaps, Restore all keymaps to default

**File** `ui/space_userpref_keymap.py:691`

`bpy.ops.wm.link_append(filepath="", directory="", filename="", 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=False, link=True, autoselect=True, active_layer=True, instance_groups=True, files=None)`

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
- **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
- **files** (Collection of `OperatorFileListElement`, (*optional*)) – Files

`bpy.ops.wm.memory_statistics()`  
Print memory statistics to the console

`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.path_open` (*filepath=""*)  
Open a path in a file browser

**Parameters**

- **filepath** (*string, (optional)*) – File Path

**File** `op/wm.py:505`

`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** `op/wm.py:739`

`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** `op/wm.py:673`

`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** `op/wm.py:766`

`bpy.ops.wm.quit_blender` ()  
Quit Blender

`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, never None)*) – Type
- **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** `op/wm.py:787`



`bpy.ops.wm.url_open(url="")`  
Open a website in the Webbrowser

**Parameters**

- `url` (*string, (optional)*) – URL, URL to open

**File** `op/wm.py:492`

`bpy.ops.wm.window_duplicate()`  
Duplicate the current Blender window

`bpy.ops.wm.window_fullscreen_toggle()`  
Toggle the current window fullscreen

## 1.2.61 World Operators

`bpy.ops.world.new()`  
Add a new world

## 1.3 Types (bpy.types)

### 1.3.1 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` collection of `FCurve`, (readonly)

**frame\_range**

The final frame range of all fcurves 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` collection of `ActionGroup`, (readonly)

**pose\_markers**

Markers specific to this Action, for labeling poses

**Type** `ActionPoseMarkers` collection of `TimelineMarker`, (readonly)

### Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `ActionActuator.action`
- `ActionConstraint.action`
- `AnimData.action`
- `BlendData.actions`
- `MainActions.new`
- `MainActions.remove`
- `NlaStrip.action`
- `Object.pose_library`
- `ShapeActionActuator.action`
- `SpaceDopeSheetEditor.action`

### 1.3.2 ActionActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.ActionActuator` (*Actuator*)  
Actuator to control the object movement

**action**

**Type** `Action`

**frame\_blend\_in**

Number of frames of motion blending

**Type** `int` in `[0, 32767]`, default `0`

**frame\_end**

**Type** `int` in `[0, 300000]`, default `0`

**frame\_property**

Assign the action's current frame number to this property

**Type** string, default ""

**frame\_start**

**Type** int in [0, 300000], default 0

**play\_mode**

Action playback type

**Type** enum in ['PLAY', '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`

### 1.3.3 ActionConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

**class** `bpy.types.ActionConstraint` (*Constraint*)

Map an action to the transform axes of a bone

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`

- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.4 ActionFCurves(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ActionFCurves` (`bpy_struct`)

Collection of action fcurves

**new** (`data_path`, `array_index=0`, `action_group=""`)

Add a keyframe to the curve.

#### Parameters

- **data\_path** (*string*) – Data Path, FCurve data path to use.
- **array\_index** (*int in [0, inf], (optional)*) – Index, Array index.
- **action\_group** (*string, (optional)*) – Action Group, Action group to add this fcurve into.

**Returns** Newly created fcurve

**Return type** `FCurve`

**remove** (`fcurve`)

Remove action group.

#### Parameters

- **fcurve** (`FCurve`, (never None)) – FCurve 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`

### 1.3.5 ActionGroup(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ActionGroup` (*bpy\_struct*)  
Groups of F-Curves

**channels**

F-Curves in this group

**Type** 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`

### 1.3.6 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`

### 1.3.7 ActionPoseMarkers(*bpy\_struct*)

base class — `bpy_struct`

**class** `bpy.types.ActionPoseMarkers` (*bpy\_struct*)  
Collection of timeline markers

**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`

### 1.3.8 Actuator(`bpy_struct`)

base class — `bpy_struct`

subclasses — `ShapeActionActuator`, `VisibilityActuator`, `FCurveActuator`, `MessageActuator`, `RandomActuator`, `Filter2DActuator`, `GameActuator`, `CameraActuator`, `ArmatureActuator`, `SoundActuator`, `ParentActuator`, `SceneActuator`, `StateActuator`, `ActionActuator`, `PropertyActuator`, `ObjectActuator`, `ConstraintActuator`, `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', 'F-Curve', 'FILTER\_2D', 'GAME', 'MESSAGE', 'OBJECT', 'PARENT', 'PROPERTY', 'RANDOM', 'SCENE', 'SHAPE\_ACTION', 'SOUND', 'STATE', 'VISIBILITY'], default 'OBJECT'

**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`

### 1.3.9 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`

### 1.3.10 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`

### 1.3.11 Addons(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.Addons` (*`bpy_struct`*)  
Collection of add-ons

**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`

### 1.3.12 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`

### 1.3.13 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`

### 1.3.14 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

**Type** enum in ['REPLACE', 'ADD', 'SUBTRACT', 'MULTIPLY'], default 'REPLACE'

**action\_extrapolation**

Action to take for gaps past the Active Action's range (when evaluating with NLA)

**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** Collection of `FCurve`, (readonly)

**nla\_tracks**

NLA Tracks (i.e. Animation Layers)

**Type** 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`
- `Material.animation_data`
- `Mesh.animation_data`
- `MetaBall.animation_data`
- `NodeTree.animation_data`
- `Object.animation_data`
- `ParticleSettings.animation_data`
- `Scene.animation_data`
- `Texture.animation_data`
- `World.animation_data`

### 1.3.15 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`

### 1.3.16 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

**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

**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`

### 1.3.17 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

**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`

### 1.3.18 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_path_builder`
- `UILayout.template_vectorscope`
- `UILayout.template_waveform`

### 1.3.19 Area(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.Area` (*bpy\_struct*)

Area in a subdivided screen, containing an editor

**active\_space**

Space currently being displayed in this area

**Type** `Space`, (readonly)

**regions**

Regions this area is subdivided in

**Type** Collection of `Region`, (readonly)

**show\_menus**

Show menus in the header

**Type** boolean, default `False`

**spaces**

Spaces contained in this area, the first space is active

**Type** 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’, ‘AUDIO\_WINDOW’, ‘DOPESHEET\_EDITOR’, ‘NLA\_EDITOR’, ‘SCRIPTS\_WINDOW’, ‘TIMELINE’, ‘NODE\_EDITOR’, ‘LOGIC\_EDITOR’, ‘CONSOLE’, ‘USER\_PREFERENCES’], default ‘EMPTY’

**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`

### 1.3.20 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

**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.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.use\_specular
- Lamp.texture\_slots
- Lamp.type

## Inherited Functions

- bpy\_struct.as\_pointer
- bpy\_struct.callback\_add
- bpy\_struct.callback\_remove
- bpy\_struct.driver\_add
- bpy\_struct.driver\_remove
- bpy\_struct.get
- bpy\_struct.is\_property\_hidden
- bpy\_struct.is\_property\_set
- bpy\_struct.items
- bpy\_struct.keyframe\_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



### 1.3.21 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` collection of `Bone`, (readonly)

**draw\_type**

**Type** enum in ['OCTAHEDRAL', 'STICK', 'BBONE', 'ENVELOPE'], default 'OCTAHEDRAL'

**edit\_bones**

**Type** `ArmatureEditBones` 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

**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

**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.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`

## References

- `BlendData.armatures`
- `MainArmatures.new`
- `MainArmatures.remove`

### 1.3.22 ArmatureActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.ArmatureActuator` (*Actuator*)

Actuator to ..

**bone**

Bone on which the constraint is defined

**Type** string, default ""

**constraint**

Name of the constraint you want to control

**Type** string, default ""

**mode**

**Type** enum in ['RUN', 'ENABLE', 'DISABLE', 'SETTARGET', 'SETWEIGHT'], default 'RUN'

**secondary\_target**

Set weight of this constraint

**Type** Object

**target**

Set this object as the target of the constraint

**Type** Object

**weight**

Set 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`

### 1.3.23 ArmatureBones(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ArmatureBones` (`bpy_struct`)

Collection of armature bones

**active**

Armatures 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`

### 1.3.24 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`

### 1.3.25 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`**

**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**

**Type** boolean, default False

**vertex\_group**

Vertex group name

**Type** string, default ""

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.26 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', 'ROTERRORBELOW', 'ROTERRORBELOW'], 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`

### 1.3.27 ArrayModifier(Modifier)

base classes — `bpy_struct`, `Modifier`



---

```
class bpy.types.ArrayModifier (Modifier)
    Array duplication modifier

    constant_offset_displace
        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
        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
        Type Object

    relative_offset_displace
        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.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`

### 1.3.28 BackgroundImage(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.BackgroundImage` (*bpy\_struct*)

Image and settings for display in the 3d View background

**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**

Offsets image horizontally from the world origin

**Type** float in `[-inf, inf]`, default 0.0

**offset\_y**

Offsets image vertically from the world origin

**Type** float in `[-inf, inf]`, 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

**transparency**

Amount to blend the image against the background color

**Type** float in `[0, 1]`, default 0.0

**view\_axis**

The axis to display the image on

**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

- `SpaceView3D.background_images`

### 1.3.29 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, 180], 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**

**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.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`

### 1.3.30 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', 'AUTO', 'VECTOR', 'ALIGNED']`, 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', 'AUTO', 'VECTOR', 'ALIGNED']`, default `'FREE'`

**hide**

Visibility status

**Type** boolean, default `False`

**radius**

Radius for bevelling

**Type** float in `[-inf, inf]`, default `0.0`, (readonly)

**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`

### 1.3.31 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** `MainActions` collection of `Action`, (readonly)

**armatures**

Armature datablocks.

**Type** `MainArmatures` collection of `Armature`, (readonly)

### **brushes**

Brush datablocks.

**Type** `MainBrushes` collection of `Brush`, (readonly)

### **cameras**

Camera datablocks.

**Type** `MainCameras` collection of `Camera`, (readonly)

### **curves**

Curve datablocks.

**Type** `MainCurves` collection of `Curve`, (readonly)

### **filepath**

Path to the .blend file

**Type** string, default "", (readonly)

### **fonts**

Vector font datablocks.

**Type** `MainFonts` collection of `VectorFont`, (readonly)

### **grease\_pencil**

Grease Pencil datablocks.

**Type** Collection of `GreasePencil`, (readonly)

### **groups**

Group datablocks.

**Type** `MainGroups` collection of `Group`, (readonly)

### **images**

Image datablocks.

**Type** `MainImages` collection of `Image`, (readonly)

### **is\_dirty**

Has the current session been saved to disk as a .blend file

**Type** boolean, default False, (readonly)

### **lamps**

Lamp datablocks.

**Type** `MainLamps` collection of `Lamp`, (readonly)

### **lattices**

Lattice datablocks.

**Type** `MainLattices` collection of `Lattice`, (readonly)

### **libraries**

Library datablocks.

**Type** Collection of `Library`, (readonly)

### **materials**

Material datablocks.

**Type** `MainMaterials` collection of `Material`, (readonly)

**meshes**

Mesh datablocks.

**Type** `MainMeshes` collection of `Mesh`, (readonly)

**metaballs**

Metaball datablocks.

**Type** `MainMetaBalls` collection of `MetaBall`, (readonly)

**node\_groups**

Node group datablocks.

**Type** `MainNodeTrees` collection of `NodeTree`, (readonly)

**objects**

Object datablocks.

**Type** `MainObjects` collection of `Object`, (readonly)

**particles**

Particle datablocks.

**Type** `MainParticles` collection of `ParticleSettings`, (readonly)

**scenes**

Scene datablocks.

**Type** `MainScenes` collection of `Scene`, (readonly)

**screens**

Screen datablocks.

**Type** Collection of `Screen`, (readonly)

**scripts**

Script datablocks (DEPRECATED).

**Type** Collection of `ID`, (readonly)

**shape\_keys**

Key datablocks.

**Type** Collection of `Key`, (readonly)

**sounds**

Sound datablocks.

**Type** Collection of `Sound`, (readonly)

**texts**

Text datablocks.

**Type** `MainTexts` collection of `Text`, (readonly)

**textures**

Texture datablocks.

**Type** `MainTextures` collection of `Texture`, (readonly)

**window\_managers**

Window manager datablocks.

**Type** Collection of `WindowManager`, (readonly)

**worlds**

World datablocks.



**Type** `MainWorlds` 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`

### 1.3.32 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

**Type** enum in ['LINEAR', 'QUADRATIC', 'EASING', 'DIAGONAL', 'SPHERICAL', 'QUADRATIC\_SPHERE', 'RADIAL'], default 'LINEAR'

**use\_flip\_axis**

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.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`

### 1.3.33 BlenderRNA(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.BlenderRNA` (*bpy\_struct*)  
Blender RNA structure definitions

**structs**

**Type** 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`

### 1.3.34 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**

**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`

### 1.3.35 BoidRuleAverageSpeed(BoidRule)

base classes — `bpy_struct`, `BoidRule`

**class** `bpy.types.BoidRuleAverageSpeed` (*BoidRule*)

**level1**

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`

### 1.3.36 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`

### 1.3.37 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`

### 1.3.38 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`

### 1.3.39 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`

### 1.3.40 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`

### 1.3.41 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**

The maximum distance from which a boid can attack

**Type** float in [0, 100], default 0.0

**states**

**Type** 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`

### 1.3.42 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** Collection of `BoidRule`, (readonly)

**ruleset\_type**

How the rules in the list are evaluated

**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`

### 1.3.43 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

**children**

Bones which are children of this bone

**Type** 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  $[-inf, inf]$ , 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  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**tail\_radius**

Radius of tail of bone (for Envelope deform only)

**Type** float in  $[0, inf]$ , default 0.0

**use\_connect**

When bone has a parent, bone's head is struck 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\_hinge**

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 basenames 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`

### 1.3.44 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`

### 1.3.45 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`

### 1.3.46 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**

**Type** `enum` in [`'INTERSECT'`, `'UNION'`, `'DIFFERENCE'`], default `'INTERSECT'`

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.47 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.srna`
- `Property.description`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_runtime`
- `Property.is_registered`

- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `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`

### 1.3.48 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

**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**

**Type** enum in ['ADD', 'SUBTRACT'], default 'ADD'

**icon\_filepath**

File path to brush icon

**Type** string, default ""

**imagepaint\_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**

**Type** enum in ['DOTS', 'DRAG\_DOT', 'SPACE', 'ANCHORED', 'AIRBRUSH'], default 'DOTS'

**texture**

**Type** [Texture](#)

**texture\_angle\_source\_no\_random**

**Type** enum in ['USER', 'RAKE'], default 'USER'

**texture\_angle\_source\_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\_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\_sculpt**

Use this brush in sculpt mode

**Type** boolean, default False

**use\_paint\_texture**

Use this brush in texture paint 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

**vertexpaint\_tool**

**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.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

## References

- BlendData.brushes
- MainBrushes.new
- MainBrushes.remove
- Paint.brush

### 1.3.49 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`

### 1.3.50 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.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`

### 1.3.51 Camera(ID)

base classes — `bpy_struct`, `ID`

**class** `bpy.types.Camera` (*ID*)

Camera datablock for storing camera settings

**angle**

Perspective Camera lens 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, 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 [0.1, 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, 1000], default 0.0

**passthrough\_alpha**

Opacity (alpha) of the darkened overlay in Camera view

**Type** float in [0, 1], 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\_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\_passepartout**

Show a darkened overlay outside the image area 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

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.cameras`
- `MainCameras.new`
- `MainCameras.remove`

### 1.3.52 CameraActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.CameraActuator` (*Actuator*)

Actuator to ..

**axis**

Specify the axis the Camera will try to get behind

**Type** enum in ['X', 'Y'], default 'X'

**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`

### 1.3.53 CastModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

**class** `bpy.types.CastModifier` (*Modifier*)

Cast modifier to cast to other shapes

**cast\_type**

**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.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`

### 1.3.54 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`

### 1.3.55 ChildOfConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

**class** `bpy.types.ChildOfConstraint` (*Constraint*)

Creates constraint-based parent-child relationship

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.56 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`

### 1.3.57 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`

- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.58 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

**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`

**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`

### 1.3.59 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.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`

### 1.3.60 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`

### 1.3.61 CloudsTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

**class** `bpy.types.CloudsTexture` (*Texture*)

Procedural noise texture

**cloud\_type**

**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

**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, inf], default 0

**noise\_scale**

Sets scaling for noise input

**Type** float in [0.0001, inf], default 0.0

**noise\_type**

**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.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`

### 1.3.62 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.srna`
- `Property.description`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_runtime`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `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`

### 1.3.63 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.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`

### 1.3.64 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

**Type** string, default ""

**property**

Only look for Objects with this property

**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`

### 1.3.65 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

**stickiness**

Amount of stickiness 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`

### 1.3.66 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` collection of `ColorRampElement`, (readonly)

#### **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

- `CompositorNodeValToRGB.color_ramp`
- `Material.diffuse_ramp`
- `Material.specular_ramp`
- `PointDensity.color_ramp`
- `ShaderNodeValToRGB.color_ramp`
- `Texture.color_ramp`
- `TextureNodeValToRGB.color_ramp`
- `UserPreferencesSystem.weight_color_range`

### 1.3.67 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**

**Type** float array of 4 items in  $[-\text{inf}, \text{inf}]$ , default (0.0, 0.0, 0.0, 0.0)

**position**

**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`

### 1.3.68 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`

### 1.3.69 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`
- `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`

### 1.3.70 CompositorNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `CompositorNodeSepHSVA`, `CompositorNodeValToRGB`, `CompositorNodeSepYCCA`,  
`CompositorNodeSetAlpha`, `CompositorNodeCrop`, `CompositorNodeMath`,  
`CompositorNodeCurveRGB`, `CompositorNodeNormal`, `CompositorNodeDilateErode`,  
`CompositorNodeGamma`, `CompositorNodeRotate`, `CompositorNodeLensdist`,  
`CompositorNodeLumaMatte`, `CompositorNodeTranslate`, `CompositorNodeCombYCCA`,  
`CompositorNodeBilateralblur`, `CompositorNodeZcombine`, `CompositorNodeFilter`,  
`CompositorNodePremulKey`, `CompositorNodeMixRGB`, `CompositorNodeTime`,  
`CompositorNodeValue`, `CompositorNodeHueCorrect`, `CompositorNodeIDMask`,  
`CompositorNodeVecBlur`, `CompositorNodeRLayers`, `CompositorNodeComposite`,  
`CompositorNodeCombRGBA`, `CompositorNodeViewer`, `CompositorNodeCombHSVA`,  
`CompositorNodeOutputFile`, `CompositorNodeInvert`, `CompositorNodeFlip`,  
`CompositorNodeDistanceMatte`, `CompositorNodeRGBToBW`, `CompositorNodeCombYUVA`,  
`CompositorNodeBlur`, `CompositorNodeDefocus`, `CompositorNodeGlare`,

```
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', 'SETALPHA', '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', 'GLARE', 'TONEMAP', 'LENSDIST', 'SCRIPT', 'GROUP'], default 'VIEWER', (readonly)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.71 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.location`
- `Node.outputs`
- `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`

### 1.3.72 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.location`
- `Node.outputs`
- `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`

### 1.3.73 CompositorNodeBlur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeBlur` (*CompositorNode*)

**factor**

**Type** float in [0, 2], default 0.0

**factor\_x**

**Type** float in [0, 1], default 0.0

**factor\_y**

**Type** float in [0, 1], 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.location`
- `Node.outputs`
- `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`

### 1.3.74 CompositorNodeBrightContrast(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeBrightContrast` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.75 CompositorNodeChannelMatte(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeChannelMatte` (*CompositorNode*)

#### **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

**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.location`
- `Node.outputs`
- `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`

### 1.3.76 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, 30], default 0.0

**tolerance**

Tolerance for a color to be considered a keying color

**Type** float in [1, 80], default 0.0

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.77 CompositorNodeColorBalance(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeColorBalance` (*CompositorNode*)

**correction\_method**

**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 [-inf, inf], default (1.0, 1.0, 1.0)

**slope**

Correction for Highlights

**Type** float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.78 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.location`
- `Node.outputs`
- `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`

### 1.3.79 CompositorNodeColorSpill(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeColorSpill` (*CompositorNode*)

**channel**

**Type** enum in ['R', 'G', 'B'], default 'R'

**limit\_channel**

**Type** enum in ['R', 'G', 'B'], default 'R'

**limit\_method**

**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.location`
- `Node.outputs`
- `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`

### 1.3.80 CompositorNodeCombHSVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeCombHSVA` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.81 CompositorNodeCombRGBA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeCombRGBA` (*CompositorNode*)



## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.82 CompositorNodeCombYCCA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeCombYCCA` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.83 CompositorNodeCombYUVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeCombYUVA` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.84 CompositorNodeComposite(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeComposite` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.85 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.location`
- `Node.outputs`
- `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`

### 1.3.86 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.location`
- `Node.outputs`
- `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`

### 1.3.87 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.location`
- `Node.outputs`
- `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`

### 1.3.88 CompositorNodeDBlur(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeDBlur` (*CompositorNode*)

**angle**

**Type** float in [0, 360], 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 [-360, 360], 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.location`
- `Node.outputs`
- `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`

### 1.3.89 CompositorNodeDefocus(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeDefocus` (*CompositorNode*)

#### **angle**

Bokeh shape rotation offset in degrees

**Type** int in [0, 90], default 0

#### **blur\_max**

blur limit, maximum CoC radius, 0=no limit

**Type** float in [0, 10000], default 0.0

#### **bokeh**

**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 zbuffer (auto enabled if node not image based, eg. time node)

**Type** boolean, default False

**z\_scale**

Scales the Z input when not using a zbuffer, 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.location`
- `Node.outputs`
- `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`

### 1.3.90 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.location`
- `Node.outputs`
- `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`

### 1.3.91 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.location`
- `Node.outputs`
- `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`

### 1.3.92 CompositorNodeDisplace(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeDisplace` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.93 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.location`
- `Node.outputs`
- `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`

### 1.3.94 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.location`
- `Node.outputs`
- `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`

### 1.3.95 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.location`
- `Node.outputs`
- `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`

### 1.3.96 CompositorNodeGamma(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeGamma` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.97 CompositorNodeGlare(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeGlare` (*CompositorNode*)

**angle\_offset**

Streak angle offset in degrees

**Type** float in [0, 180], 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.location`
- `Node.outputs`
- `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`

### 1.3.98 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.location`
- `Node.outputs`
- `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`

### 1.3.99 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.location`
- `Node.outputs`



- `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`

### 1.3.100 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, 10000], default 0

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.101 CompositorNodeImage(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeImage` (*CompositorNode*)

**frame\_duration**

Number of images used in animation

**Type** int in [0, 300000], default 0

**frame\_offset**

Offsets the number of the frame to use in the animation

**Type** int in [-300000, 300000], default 0

**frame\_start**

**Type** int in [-300000, 300000], default 0

**image**

**Type** `Image`

**layer**

**Type** enum in ['PLACEHOLDER'], default 'PLACEHOLDER'

**use\_auto\_refresh**

**Type** boolean, default False

**use\_cyclic**

**Type** boolean, default False

### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.102 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.location`
- `Node.outputs`
- `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`

### 1.3.103 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.location`
- `Node.outputs`
- `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`

### 1.3.104 CompositorNodeLevels(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeLevels` (*CompositorNode*)

**channel**

**Type** enum in ['COMBINED\_RGB', 'RED', 'GREEN', 'BLUE', 'LUMINANCE'], default 'COMBINED\_RGB'

### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.105 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.location`
- `Node.outputs`
- `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`

### 1.3.106 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.location`
- `Node.outputs`
- `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`

### 1.3.107 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.location`
- `Node.outputs`
- `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`

### 1.3.108 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.location`
- `Node.outputs`
- `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`

### 1.3.109 CompositorNodeMixRGB(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeMixRGB` (*CompositorNode*)

#### **blend\_type**

**Type** enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'DODGE', 'BURN', 'COLOR', 'VALUE', 'SATURATION', 'HUE', '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.location`
- `Node.outputs`
- `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`

### 1.3.110 CompositorNodeNormal(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeNormal` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.111 CompositorNodeNormalize(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeNormalize` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.112 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.location`
- `Node.outputs`
- `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`

### 1.3.113 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.location`

- `Node.outputs`
- `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`

### 1.3.114 CompositorNodeRGB(*CompositorNode*)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeRGB` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.115 CompositorNodeRGBToBW(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeRGBToBW` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.116 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.location`
- `Node.outputs`
- `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`

### 1.3.117 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.location`
- `Node.outputs`
- `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`

### 1.3.118 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.location`
- `Node.outputs`
- `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`

### 1.3.119 CompositorNodeSepHSVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeSepHSVA` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.120 CompositorNodeSepRGBA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeSepRGBA` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.121 CompositorNodeSepYCCA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeSepYCCA` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.122 CompositorNodeSepYUVA(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeSepYUVA` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.123 CompositorNodeSetAlpha(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeSetAlpha` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.124 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.location`
- `Node.outputs`
- `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`

### 1.3.125 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.location`
- `Node.outputs`
- `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`

### 1.3.126 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.location`
- `Node.outputs`
- `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`

### 1.3.127 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.location`
- `Node.outputs`
- `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`

### 1.3.128 CompositorNodeTranslate(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeTranslate` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.129 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.location`
- `Node.outputs`
- `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`

### 1.3.130 CompositorNodeValue(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeValue` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`

- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.131 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.location`
- `Node.outputs`
- `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`

### 1.3.132 CompositorNodeViewer(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

class `bpy.types.CompositorNodeViewer` (*CompositorNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.133 CompositorNodeZcombine(CompositorNode)

base classes — `bpy_struct`, `Node`, `CompositorNode`

**class** `bpy.types.CompositorNodeZcombine` (*CompositorNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.134 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`

### 1.3.135 Constraint(bpy\_struct)

base class — `bpy_struct`

subclasses — `KinematicConstraint`, `CopyScaleConstraint`, `ShrinkwrapConstraint`, `FollowPathConstraint`, `LockedTrackConstraint`, `CopyTransformsConstraint`, `PythonConstraint`, `LimitDistanceConstraint`, `TransformConstraint`, `PivotConstraint`, `StretchToConstraint`, `LimitRotationConstraint`, `LimitLocationConstraint`, `ChildOfConstraint`, `CopyRotationConstraint`, `LimitScaleConstraint`, `DampedTrackConstraint`, `TrackToConstraint`, `ClampToConstraint`, `SplineIKConstraint`, `MaintainVolumeConstraint`, `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 invalid settings and will not 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  
**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  
**Type** enum in ['WORLD', 'POSE', 'LOCAL\_WITH\_PARENT', 'LOCAL'], default 'WORLD'

**type**  
**Type** enum in ['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 'COPY\_LOCATION', (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`

### 1.3.136 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 [-inf, inf], 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 [-inf, inf], default 0.0

**damping**

Damping factor: time constant (in frame) of low pass filter

**Type** int in [0, 32767], default 0

**damping\_rotation**

Use a different damping for orientation

**Type** int in [0, 32767], default 0

**direction**

Set the 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'

**distance**

Set the maximum length of ray

**Type** float in [-inf, inf], default 0.0

**fh\_damping**

Damping factor of the Fh spring force

**Type** float in [-inf, inf], default 0.0

**fh\_height**

Height of the Fh 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 detect only Objects with this property



**Type** string, default ""

**range**

Set the 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)

**spring**

Spring force within the Fh area

**Type** float in [-inf, inf], default 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`

### 1.3.137 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`

### 1.3.138 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.check`
- `Operator.draw`
- `Operator.execute`
- `Operator.invoke`
- `Operator.modal`
- `Operator.poll`
- `Panel.draw`
- `Panel.draw_header`
- `Panel.poll`

### 1.3.139 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`

### 1.3.140 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**

**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`

### 1.3.141 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`



- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.142 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.143 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.144 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.145 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

**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

**materials**

**Type** `IDMaterials` 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, inf]`, default 0

**render\_resolution\_v**

Surface resolution in V direction used while rendering. Zero skips this property

**Type** int in [0, inf], default 0

**resolution\_u**

Surface resolution in U direction

**Type** int in [1, inf], default 0

**resolution\_v**

Surface resolution in V direction

**Type** int in [1, inf], 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](#) 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

**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\_back**

Draw filled back for extruded/beveled curves

**Type** boolean, default False

**use\_fill\_deform**

Fill curve after applying deformation

**Type** boolean, default False

**use\_fill\_front**

Draw filled front for extruded/beveled curves

**Type** boolean, default False

**use\_map\_on\_length**

Generate texture mapping coordinates following the curve direction, rather than the local bounding box

**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

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.curves`
- `MainCurves.new`
- `MainCurves.remove`

### 1.3.146 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** 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`

### 1.3.147 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`

### 1.3.148 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** 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`
- `PointLamp.falloff_curve`
- `ShaderNodeRGBCurve.mapping`
- `ShaderNodeVectorCurve.mapping`
- `SpaceImageEditor.curves`
- `SpotLamp.falloff_curve`
- `TextureNodeCurveRGB.mapping`
- `TextureNodeCurveTime.curve`

### 1.3.149 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**

Vertex group name

**Type** string, default ""

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.150 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`

### 1.3.151 DampedTrackConstraint(Constraint)

base classes — `bpy_struct`, `Constraint`

**class** `bpy.types.DampedTrackConstraint` (*Constraint*)

Points toward target by taking the shortest rotation path

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.152 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.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`

### 1.3.153 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`

### 1.3.154 DisplaceModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

**class** `bpy.types.DisplaceModifier` (*Modifier*)

Displacement modifier

**direction**

**Type** enum in ['X', 'Y', 'Z', 'NORMAL', 'RGB\_TO\_XYZ'], default 'X'

**mid\_level**

Material value that gives no displacement

**Type** float in [0, 1], default 0.0

**strength**

**Type** float in [-inf, inf], default 0.0

**texture**



**Type** Texture

**texture\_coordinate\_object**

**Type** Object

**texture\_coords**

**Type** enum in ['LOCAL', 'GLOBAL', 'OBJECT', 'UV'], default 'LOCAL'

**uv\_layer**

UV layer name

**Type** string, default ""

**vertex\_group**

Vertex group name

**Type** string, default ""

## Inherited Properties

- bpy\_struct.id\_data
- Modifier.name
- 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

### 1.3.155 DistortedNoiseTexture(Texture)

base classes — bpy\_struct, ID, Texture

**class** `bpy.types.DistortedNoiseTexture` (*Texture*)

Procedural distorted noise texture

**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

**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

**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.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`

### 1.3.156 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 ""

**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

**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**

**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\_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

**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

**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`

### 1.3.157 DopeSheet(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.DopeSheet` (*bpy\_struct*)

Settings for filtering the channels shown in Animation Editors

**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\_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\_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\_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\_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`

### 1.3.158 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` 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`

### 1.3.159 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', 'SOUND', 'TEXT', 'TEXTURE', 'WORLD', 'WINDOWMANAGER'], default 'OBJECT'

**transform\_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'

**use\_local\_space\_transform**

Use transforms in Local Space (as opposed to the worldspace default)

**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

- `DriverVariable.targets`

### 1.3.160 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. Also, must not start with a symbol or digit)

**Type** string, default ""

**targets**

Sources of input data for evaluating this variable

**Type** Collection of `DriverTarget`, (readonly)

**type**

Driver variable type

**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`

### 1.3.161 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`

### 1.3.162 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, 180], 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.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`

### 1.3.163 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

**`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 [-inf, 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  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**tail\_radius**

Radius of tail of bone (for Envelope deform only)

**Type** float in  $[0, inf]$ , default 0.0

**use\_connect**

When bone has a parent, bone's head is struck 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\_hinge**

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 basenames 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.

**ttransform** (*matrix*)

Transform the the bones head, tail, roll and envelope (when the matrix has a scale component). Expects a 4x4 or 3x3 matrix.

**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`

### 1.3.164 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 `[-inf, 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 (cant be on an 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`

### 1.3.165 EffectSequence(Sequence)

base classes — `bpy_struct`, `Sequence`

subclasses — `GlowSequence`, `PluginSequence`, `ColorSequence`, `TransformSequence`, `WipeSequence`, `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

**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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.166 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`
- `ParticleSettings.effector_weights`
- `SmokeDomainSettings.effector_weights`
- `SoftBodySettings.effector_weights`

### 1.3.167 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)

**items**

Possible values for the property

**Type** Collection of `EnumPropertyItem`, (readonly)

## Inherited Properties

- `bpy_struct.id_data`
- `Property.name`
- `Property.srna`
- `Property.description`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_runtime`

- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `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`

### 1.3.168 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.items`

### 1.3.169 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 [0.01, inf], default 0.0

**depth**

Number of times a map will be rendered recursively (mirror effects.)

**Type** int in [0, 5], default 0

**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**

**Type** enum in ['CUBE', 'PLANE'], default 'CUBE'

**resolution**

Pixel resolution of the rendered environment map

**Type** int in [50, 4096], default 0

**source**

**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

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.170 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**

Multiplies 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**

Uses 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.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`

### 1.3.171 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], default 'NONE', (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_props_popup`

### 1.3.172 ExplodeModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

**class** `bpy.types.ExplodeModifier` (*Modifier*)

Explosion effect modifier based on a particle system

**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\_split**

Split 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.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`

### 1.3.173 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`

### 1.3.174 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 [-inf, inf], 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 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 collection of FModifier, (readonly)

    mute
        F-Curve is not evaluated

        Type boolean, default False

```

**sampled\_points**

Sampled animation data

**Type** Collection of `FCurveSample`, (readonly)

**select**

F-Curve is selected for editing

**Type** boolean, default False

**use\_auto\_handle\_clamp**

All auto-handles for F-Curve are clamped

**Type** boolean, default False

**evaluate** (*frame*)

Evaluate fcurve.

**Parameters**

- **frame** (*float in [-inf, inf]*) – Frame, Evaluate fcurve at given frame

**Returns** Position, FCurve 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`
- `NlaStrip.fcurves`

### 1.3.175 FCurveActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.FCurveActuator` (*Actuator*)

Actuator to animate the object

**apply\_to\_children**

Update F-Curve on all children Objects as well

**Type** boolean, default False

**frame\_end**

**Type** int in [-inf, inf], default 0

**frame\_property**

Assign the action's current frame number to this property

**Type** string, default ""

**frame\_start**

**Type** int in [-inf, inf], default 0

**play\_type**

Specify the way you want to play the animation

**Type** enum in ['PLAY', 'PINGPONG', 'FLIPPER', 'STOP', 'END', 'PROP'], default 'PLAY'

**property**

Use this property to define the F-Curve position

**Type** string, default ""

**use\_additive**

F-Curve is added to the current loc/rot/scale in global or local coordinate according to Local flag

**Type** boolean, default False

**use\_force**

Apply F-Curve as a global or local force depending on the local option (dynamic objects only)

**Type** boolean, default False

**use\_local**

Let the F-Curve 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`

### 1.3.176 FCurveKeyframePoints(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.FCurveKeyframePoints` (*bpy\_struct*)

Collection of keyframe points

**add** (*frame, value, replace=False, needed=False, fast=False*)

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
- **replace** (*boolean, (optional)*) – Replace, Don't add any new keyframes, but just replace existing ones
- **needed** (*boolean, (optional)*) – Needed, Only adds keyframes that are needed
- **fast** (*boolean, (optional)*) – Fast, Fast keyframe insertion to avoid recalculating the curve each time

**Returns** Newly created keyframe

**Return type** `Keyframe`

**remove** (*keyframe*, *fast=False*)  
Remove keyframe from an fcurve.

#### 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`

### 1.3.177 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 fcurve.

**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`

### 1.3.178 `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`

**1.3.179 FModifier(bpy\_struct)**base class — `bpy_struct`

subclasses — `FModifierCycles`, `FModifierFunctionGenerator`, `FModifierPython`, `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**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)

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.180 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** float in [-inf, inf], default 0.0

**cycles\_before**

Maximum number of cycles to allow before first keyframe. (0 = infinite)

**Type** float in [-inf, inf], default 0.0

**mode\_after**

Cycling mode to use after last keyframe

**Type** enum in ['NONE', 'REPEAT', 'REPEAT\_OFFSET', 'MIRROR'], default 'NONE'

**mode\_before**

Cycling mode to use before first keyframe

**Type** enum in ['NONE', 'REPEAT', 'REPEAT\_OFFSET', 'MIRROR'], default 'NONE'

## Inherited Properties

- `bpy_struct.id_data`
- `FModifier.active`
- `FModifier.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.181 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** 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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.182 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`

### 1.3.183 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

**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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.184 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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`

- `bpy_struct.values`

### 1.3.185 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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.186 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.is_valid`
- `FModifier.show_expanded`

- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.187 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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`



- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.188 FModifierStepped(FModifier)

base classes — `bpy_struct`, `FModifier`

**class** `bpy.types.FModifierStepped` (*FModifier*)

Holds 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.is_valid`
- `FModifier.show_expanded`
- `FModifier.mute`
- `FModifier.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.189 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**

Fall-off shape

**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**

Noise of the force

**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 noise

**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

**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`
- `ParticleSettings.force_field_1`
- `ParticleSettings.force_field_2`

### 1.3.190 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

**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**

**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`

### 1.3.191 Filter2DActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.Filter2DActuator` (*Actuator*)

Actuator to ..

**filter\_pass**

Set filter order

**Type** int in [0, 99], default 0

**gls1\_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**

Set 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`

### 1.3.192 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.srna
- Property.description
- Property.identifier
- Property.is\_never\_none
- Property.is\_readonly
- Property.is\_runtime
- Property.is\_registered
- Property.is\_registered\_optional
- Property.is\_required
- Property.is\_output
- 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

### 1.3.193 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.194 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

**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`

### 1.3.195 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

**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`

### 1.3.196 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.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`

### 1.3.197 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** int in [-300000, 300000], default 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.is\_valid
- Constraint.show\_expanded
- Constraint.influence
- Constraint.error\_location
- Constraint.owner\_space
- Constraint.is\_proxy\_local
- Constraint.error\_rotation
- Constraint.target\_space
- Constraint.type

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.198 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** 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`

### 1.3.199 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** 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`

### 1.3.200 GPencilLayer(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.GPencilLayer` (*bpy\_struct*)

Collection of related sketches

**active**

Set active layer for editing

**Type** boolean, default False

**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 [-inf, inf], default (0.0, 0.0, 0.0)

**frames**

Sketches for this layer on different frames

**Type** 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

**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`

### 1.3.201 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** 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`

### 1.3.202 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`

### 1.3.203 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`

### 1.3.204 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`

### 1.3.205 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`

### 1.3.206 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`



### 1.3.207 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** Collection of `Actuator`, (readonly)

**collision\_bounds\_type**

Selects 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 sensor to actuators

**Type** 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 coefficient 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

**physics\_type**

Selects the type of physical representation

**Type** enum in ['NO\_COLLISION', 'STATIC', 'DYNAMIC', 'RIGID\_BODY', 'SOFT\_BODY', 'OCCLUDE', 'SENSOR'], default 'NO\_COLLISION'

**properties**

Game engine properties

**Type** 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** 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**

Use physics settings in materials

**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`

### 1.3.208 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**

**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`

### 1.3.209 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**

Specify the 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`

### 1.3.210 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`

### 1.3.211 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`

### 1.3.212 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`
- `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`

### 1.3.213 GreasePencil(ID)

base classes — `bpy_struct`, `ID`

**class** `bpy.types.GreasePencil` (*ID*)

Freehand annotation sketchbook

**draw\_mode**

**Type** enum in ['CURSOR', 'VIEW', 'SURFACE', 'STROKE'], default 'VIEW'

**layers**

**Type** 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.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`

## References

- `BlendData.grease_pencil`
- `NodeTree.grease_pencil`
- `Object.grease_pencil`
- `Scene.grease_pencil`
- `SpaceImageEditor.grease_pencil`

### 1.3.214 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  $[-\text{inf}, \text{inf}]$ , 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` 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.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`

## References

- `BlendData.groups`
- `ClothCollisionSettings.group`
- `DopeSheet.filter_group`
- `EffectorWeights.group`
- `MainGroups.new`
- `MainGroups.remove`
- `Material.light_group`
- `Object.dupli_group`
- `ParticleSettings.dupli_group`

- `RenderLayer.light_override`
- `SceneRenderLayer.light_override`
- `SmokeDomainSettings.collision_group`
- `SmokeDomainSettings.effector_group`
- `SmokeDomainSettings.fluid_group`

### 1.3.215 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`) – 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`

### 1.3.216 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', 'AUDIO\_WINDOW', 'DOPESHEET\_EDITOR', 'NLA\_EDITOR', 'SCRIPTS\_WINDOW', 'TIMELINE', 'NODE\_EDITOR', 'LOGIC\_EDITOR', 'CONSOLE', 'USER\_PREFERENCES'], default 'EMPTY'

**layout**

Defines the structure of the header in the UI.

**Type** `UILayout`, (readonly)

**draw** (*context*)

Draw UI elements into the header UI layout.

**classmethod** `append` (*draw\_func*)

Prepend an draw function to this menu, takes the same arguments as the menus draw function.

**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`

### 1.3.217 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.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.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`

#### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.218 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`

### 1.3.219 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
        Vertex group name

        Type string, default ""

```

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.220 ID(*bpy\_struct*)

base class — *bpy\_struct*

subclasses — *Lattice*, *Library*, *Key*, *NodeTree*, *MetaBall*, *Text*, *World*, *Lamp*, *Brush*, *Armature*, *Mesh*, *VectorFont*, *GreasePencil*, *Sound*, *ParticleSettings*, *Scene*, *Object*, *WindowManager*, *Texture*, *Curve*, *Action*, *Group*, *Screen*, *Material*, *Image*, *Camera*

**class** *bpy.types.ID* (*bpy\_struct*)

Base type for datablocks, defining a unique name, linking from other libraries and garbage collection

**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**

Saves 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** ()

Clears the user count of a datablock so its not saved, on reload the data will be removed.

**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.

### Inherited Properties

- *bpy\_struct.id\_data*

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`
- `DopeSheet.source`
- `DriverTarget.id`
- `ID.copy`
- `Key.user`
- `KeyingSetPath.id`
- `KeyingSetPaths.add`
- `MainObjects.new`
- `Object.data`
- `SpaceNodeEditor.id`
- `SpaceNodeEditor.id_from`
- `SpaceProperties.pin_id`
- `UILayout.template_path_builder`
- `UILayout.template_preview`
- `UILayout.template_preview`

### 1.3.221 IDMaterials(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.IDMaterials` (*bpy\_struct*)

Collection of materials

**append** (*material*)

Add a new material to Mesh.

#### Parameters

- **material** (`Material`) – Material to add.

**pop** (*index*)

Add a new material to Mesh.

#### Parameters

- **index** (*int in [0, inf]*) – Frame number to set.

**Returns** Material to add.

**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`

### 1.3.222 IDProperty(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.IDProperty` (*`bpy_struct`*)

Property that stores arbitrary, user defined properties

**collection**

**Type** Collection of `IDPropertyGroup`, (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** `IDPropertyGroup`, (readonly)

#### **idp\_array**

**Type** Collection of `IDPropertyGroup`, (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`

### 1.3.223 IDPropertyGroup(bpy\_struct)

base class — `bpy_struct`

subclasses — `NetRenderSettings`, `OperatorFileListElement`, `PoseTemplateSettings`, `NetRenderSlave`, `OperatorMousePath`, `NetRenderJob`, `OperatorStrokeElement`, `PoseTemplate`

```
class bpy.types.IDPropertyGroup(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

- `IDProperty.collection`
- `IDProperty.group`
- `IDProperty.idp_array`

### 1.3.224 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

```
    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`

### 1.3.225 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

**Type** enum in ['EVEN', 'ODD'], default 'EVEN'

**file\_format**

Format used for re-saving this file

**Type** enum in ['BMP', 'IRIS', 'PNG', 'JPEG', 'TARGA', 'TARGA\_RAW', 'AVI\_JPEG', 'AVI\_RAW', 'FRAMESERVER'], 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

**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

**Type** enum in ['UV', 'REFLECTION'], default 'UV'

**packed\_file**

**Type** `PackedFile`, (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 image comes from

**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\_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

**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.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`

## References

- `BackgroundImage.image`

- `BlendData.images`
- `Brush.clone_image`
- `CompositorNodeImage.image`
- `EnvironmentMapTexture.image`
- `ImageTexture.image`
- `MainImages.load`
- `MainImages.new`
- `MainImages.remove`
- `MeshTextureFace.image`
- `SpaceImageEditor.image`
- `TextureNodeImage.image`
- `UILayout.template_image_layers`
- `UVProjectModifier.image`
- `VoxelDataTexture.image`

### 1.3.226 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

**show\_brush**

Enables brush shape while not drawing

**Type** boolean, default False

**show\_brush\_draw**

Enables brush shape while drawing

**Type** boolean, default False

**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`

### 1.3.227 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** 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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.228 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

**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**

Multiplies 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

**normal\_space**

Sets space of normal map image

**Type** enum in ['CAMERA', 'WORLD', 'OBJECT', 'TANGENT'], default 'CAMERA'

**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\_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 Area filter

**Type** boolean, default False

**use\_mipmap**

Uses auto-generated MIP maps for the image

**Type** boolean, default False

**use\_mipmap\_gauss**

Uses 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.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`

### 1.3.229 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**

The number of fields per rendered frame (2 fields is 1 image)

**Type** int in [1, 300000], default 0

**frame\_duration**

Sets the number of images of a movie to use

**Type** int in [0, 300000], default 0

**frame\_offset**

Offsets the number of the frame to use in the animation

**Type** int in [-300000, 300000], default 0

**frame\_start**

Sets the global starting frame of the movie

**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`

### 1.3.230 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

**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`

### 1.3.231 InputKeyMapPanel(Panel)

base classes — `bpy_struct`, `Panel`

**class** `bpy.types.InputKeyMapPanel` (*Panel*)

**classmethod** `append` (*draw\_func*)

Prepend an draw function to this menu, takes the same arguments as the menus draw function.

**draw\_entry** (*display\_keymaps, entry, col, level=0*)

**draw\_filtered** (*display\_keymaps, filter\_text, layout*)

**draw\_hierarchy** (*display\_keymaps, layout*)

**draw\_keymaps** (*context, layout*)

**draw\_km** (*display\_keymaps, kc, km, children, layout, level*)

**draw\_kmi** (*display\_keymaps, kc, km, kmi, layout, level*)

**static draw\_kmi\_properties** (*box, properties, title=None*)

**indented\_layout** (*layout, level*)

**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`
- `Panel.bl_context`
- `Panel.bl_idname`
- `Panel.bl_label`
- `Panel.layout`
- `Panel.bl_options`
- `Panel.bl_region_type`
- `Panel.bl_space_type`

- `Panel.text`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `Panel.poll`
- `Panel.draw`
- `Panel.draw_header`
- `Panel.append`
- `Panel.prepend`
- `Panel.remove`

### 1.3.232 `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.srna
- Property.description
- Property.identifier
- Property.is\_never\_none
- Property.is\_readonly
- Property.is\_runtime
- Property.is\_registered
- Property.is\_registered\_optional
- Property.is\_required
- Property.is\_output
- 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

### 1.3.233 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**

**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

**Type** enum in ['NEVER', 'INITIAL', 'ALWAYS'], default 'NEVER'

**solver**

Solving method selection: Automatic damping or manual damping

**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`

### 1.3.234 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, 2], 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 joystick's 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`

### 1.3.235 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)

**keys**

Shape keys

**Type** 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.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`

## References

- `BlendData.shape_keys`
- `Curve.shape_keys`
- `Lattice.shape_keys`
- `Mesh.shape_keys`

### 1.3.236 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` 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.default`
- `KeyConfigurations.new`
- `KeyConfigurations.remove`
- `WindowManager.keyconfigs`

### 1.3.237 KeyConfigurations(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.KeyConfigurations` (*bpy\_struct*)  
Collection of KeyConfigs

**active**

Active wm KeyConfig

**Type** `KeyConfig`

**default**

**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`

### 1.3.238 `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\_defined**

Keymap is defined by the user

**Type** boolean, default False

**items**

Items in the keymap, linking an operator to an input event

**Type** `KeyMapItems` 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', 'AUDIO\_WINDOW', 'DOPESHEET\_EDITOR', 'NLA\_EDITOR', 'SCRIPTS\_WINDOW', 'TIMELINE', 'NODE\_EDITOR', 'LOGIC\_EDITOR', 'CONSOLE', 'USER\_PREFERENCES'], default 'EMPTY', (readonly)

**active ()**

active

**Returns** Key Map, Active key map.

**Return type** `KeyMap`

**copy\_to\_user ()**

copy\_to\_user

**Returns** Key Map, User editable 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`
- `KeyMap.copy_to_user`
- `KeyMaps.find`
- `KeyMaps.find_modal`
- `KeyMaps.new`
- `UserPreferencesInput.edited_keymaps`

### 1.3.239 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 ""**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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], default 'NONE'

**map\_type**

Type of event mapping

**Type** enum in ['KEYBOARD', 'TWEAK', 'MOUSE', '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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], 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.items`
- `KeyMap.restore_item_to_default`
- `KeyMapItem.compare`
- `KeyMapItems.from_id`
- `KeyMapItems.new`
- `KeyMapItems.new_modal`
- `KeyMapItems.remove`

### 1.3.240 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2']) – 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2']) (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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2']) – 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], (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.items`

### 1.3.241 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'`, `'AUDIO_WINDOW'`, `'DOPESHEET_EDITOR'`, `'NLA_EDITOR'`, `'SCRIPTS_WINDOW'`, `'TIMELINE'`, `'NODE_EDITOR'`, `'LOGIC_EDITOR'`, `'CONSOLE'`, `'USER_PREFERENCES'`], (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'`, `'AUDIO_WINDOW'`, `'DOPESHEET_EDITOR'`, `'NLA_EDITOR'`, `'SCRIPTS_WINDOW'`, `'TIMELINE'`, `'NODE_EDITOR'`, `'LOGIC_EDITOR'`, `'CONSOLE'`, `'USER_PREFERENCES'`], (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`

### 1.3.242 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], default 'NONE'

#### **log**

Property that receive the keystrokes in case a string is logged

**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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], 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', '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', 'WINDOW\_DEACTIVATE', 'TIMER', 'TIMER0', 'TIMER1', 'TIMER2'], default 'NONE'

**target**

Property that indicates whether to log keystrokes as a string

**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`

### 1.3.243 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 first handle

**Type** float array of 2 items in [-inf, inf], default (0.0, 0.0)

**handle\_left\_type**

Handle types

**Type** enum in ['FREE', 'AUTO', 'VECTOR', 'ALIGNED'], default 'FREE'

#### **handle\_right**

Coordinates of the second handle

**Type** float array of 2 items in [-inf, inf], default (0.0, 0.0)

#### **handle\_right\_type**

Handle types

**Type** enum in ['FREE', 'AUTO', 'VECTOR', 'ALIGNED'], default 'FREE'

#### **interpolation**

Interpolation method to use for segment of the 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**

Handle 1 selection status

**Type** boolean, default False

#### **select\_right\_handle**

Handle 2 selection status

**Type** boolean, default False

#### **type**

The type of keyframe

**Type** enum in ['KEYFRAME', 'BREAKDOWN', 'EXTREME'], 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.add`
- `FCurveKeyframePoints.remove`

### 1.3.244 KeyingSet(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.KeyingSet` (*bpy\_struct*)

Settings that should be keyframed together

**bl\_options**

Keying set options

**Type** enum 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` collection of `KeyingSetPath`, (readonly)

**type\_info**

Callback function defines for built-in Keying Sets

**Type** `KeyingSetInfo`, (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

- `KeyingSetInfo.generate`
- `KeyingSetInfo.iterator`
- `KeyingSets.active`
- `KeyingSets.new`
- `KeyingSetsAll.active`
- `Scene.keying_sets`
- `Scene.keying_sets_all`

### 1.3.245 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

**Type** enum 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`

### 1.3.246 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

**Type** enum 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', '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`

### 1.3.247 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`

### 1.3.248 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`

### 1.3.249 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`

### 1.3.250 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

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.251 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

**texture\_slots**

Texture slots defining the mapping and influence of textures

**Type** `LampTextureSlots` collection of `LampTextureSlot`, (readonly)

**type**

Type of Lamp

**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\_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.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`

## References

- `BlendData.lamps`
- `MainLamps.new`
- `MainLamps.remove`

### 1.3.252 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'], 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`

### 1.3.253 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**

**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`

### 1.3.254 LampTextureSlots(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.LampTextureSlots` (*bpy\_struct*)  
Collection of texture slots

**classmethod** `add()`

Add a number of points to this spline.

**Returns** The newly initialized mtex.

**Return type** `LampTextureSlot`

**classmethod** `create(index)`

Add a number of points to this spline.

**Parameters**

- **index** (*int in [0, inf]*) – Index, Slot index to initialize.

**Returns** The newly initialized mtex.

**Return type** `LampTextureSlot`

**classmethod** `clear(index)`

Add a number of points to this spline.

**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`

### 1.3.255 Lattice(ID)

base classes — `bpy_struct`, `ID`

**class** `bpy.types.Lattice` (*ID*)

Lattice datablock defining a grid for deforming other objects

**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** 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.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`

## References

- `BlendData.lattices`
- `MainLattices.new`
- `MainLattices.remove`

### 1.3.256 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**

Vertex group name

**Type** `string`, default `""`

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`

- `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`

### 1.3.257 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** 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`

### 1.3.258 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 datablocks which use this library (readonly)

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.libraries`
- `ID.library`
- `Library.parent`

### 1.3.259 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

**limit\_mode**

Distances in relation to sphere of influence to allow

**Type** enum in ['LIMITDIST\_INSIDE', 'LIMITDIST\_OUTSIDE', 'LIMITDIST\_ONSURFACE'], default 'LIMITDIST\_INSIDE'

**subtarget**

**Type** string, default ""

**target**

Target Object

**Type** Object

## Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`



- `Constraint.active`
- `Constraint.mute`
- `Constraint.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.260 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.261 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.262 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.263 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

**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.is\_valid
- Constraint.show\_expanded
- Constraint.influence
- Constraint.error\_location
- Constraint.owner\_space
- Constraint.is\_proxy\_local
- Constraint.error\_rotation
- Constraint.target\_space
- Constraint.type

**Inherited Functions**

- bpy\_struct.as\_pointer
- bpy\_struct.callback\_add
- bpy\_struct.callback\_remove
- bpy\_struct.driver\_add
- bpy\_struct.driver\_remove
- bpy\_struct.get
- bpy\_struct.is\_property\_hidden
- bpy\_struct.is\_property\_set
- bpy\_struct.items
- bpy\_struct.keyframe\_delete
- bpy\_struct.keyframe\_insert
- bpy\_struct.keys
- bpy\_struct.path\_from\_id
- bpy\_struct.path\_resolve
- bpy\_struct.type\_recast
- bpy\_struct.values

**1.3.264 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

**Type** enum in ['REGISTER', 'UNDO', 'BLOCKING', 'MACRO', 'GRAB\_POINTER'], default 'REGISTER'

**name**

**Type** string, default "", (readonly)

**properties**

**Type** `OperatorProperties`, (readonly, never None)

**report** (*type, message*)

report

**Parameters**

- **type** (*enum in ['DEBUG', 'INFO', 'OPERATOR', 'WARNING', 'ERROR', 'ERROR\_INVALID\_INPUT', 'ERROR\_INVALID\_CONTEXT', 'ERROR\_OUT\_OF\_MEMORY']*) – Type
- **message** (*string*) – Report Message

**classmethod poll** (*context=None*)

Test if the operator can be called or not.

**Return type** boolean

**draw** (*context=None*)

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`

### 1.3.265 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, inf], 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.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`

### 1.3.266 MainActions(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainActions` (*bpy\_struct*)

Collection of actions

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`

- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.267 MainArmatures(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainArmatures` (*bpy\_struct*)  
Collection of armatures

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`

- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.268 MainBrushes(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainBrushes` (*bpy\_struct*)  
Collection of brushes

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.269 MainCameras(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainCameras` (*bpy\_struct*)  
Collection of cameras

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.270 MainCurves(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainCurves` (*bpy\_struct*)  
Collection of curves

**new** (*name*, *type*)

Add a new curve to the main database

#### Parameters

- **name** (*string*) – New name for the datablock.
- **type** (*enum in ['CURVE', 'SURFACE', 'TEXT']*) – 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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.271 MainFonts(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainFonts` (*bpy\_struct*)

Collection of fonts

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`

- `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`

### 1.3.272 MainGroups(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainGroups` (*bpy\_struct*)  
Collection of groups

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.273 MainImages(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainImages` (*bpy\_struct*)

Collection of images

**new** (*name*, *width=1024*, *height=1024*, *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]*, (*optional*)) – Width of the image.
- **height** (*int in [1, inf]*, (*optional*)) – 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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.274 MainLamps(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainLamps` (*bpy\_struct*)  
Collection of lamps

**new** (*name*)  
Add a new lamp to the main database

**Parameters**

- **name** (*string*) – New name for the datablock.

**Returns** New lamp datablock.

**Return type** `Lamp`

**remove** (*lamp*)  
Remove a lamp from the current blendfile.

**Parameters**

- **lamp** (`Lamp`, (never `None`)) – Lamp 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.lamps`

### 1.3.275 MainLattices(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainLattices` (*bpy\_struct*)  
Collection of lattices

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.276 MainMaterials(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainMaterials` (*bpy\_struct*)  
Collection of materials

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.277 MainMeshes(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainMeshes` (*bpy\_struct*)  
Collection of meshes

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.278 MainMetaBalls(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainMetaBalls` (*bpy\_struct*)  
Collection of metaballs

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.279 MainNodeTrees(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainNodeTrees` (*bpy\_struct*)  
Collection of node trees

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.280 MainObjects(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainObjects` (*bpy\_struct*)  
Collection of objects

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.281 MainParticles(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainParticles` (*bpy\_struct*)

Collection of particle settings

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.282 MainScenes(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainScenes` (*bpy\_struct*)  
Collection of scenes

**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`

### 1.3.283 MainTexts(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainTexts` (*bpy\_struct*)  
Collection of texts

**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`

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.284 MainTextures(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MainTextures` (*bpy\_struct*)

Collection of groups

**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']*) – Type, The type of texture to add

**Returns** New texture datablock.

**Return type** `Texture`

**remove** (*texture*)

Remove a texture from the current blendfile.

#### Parameters

- **texture** (`Texture`, (never None)) – Texture 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.textures`

### 1.3.285 MainWorlds(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MainWorlds` (*bpy\_struct*)

Collection of worlds

**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.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.286 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.287 MarbleTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

**class** `bpy.types.MarbleTexture` (*Texture*)

Procedural noise texture

**marble\_type**

**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

**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, inf], default 0

**noise\_scale**

Sets scaling for noise input

**Type** float in [0.0001, inf], default 0.0

**noise\_type**

**Type** enum in ['SOFT\_NOISE', 'HARD\_NOISE'], default 'SOFT\_NOISE'

**noisebasis\_2**

**Type** enum in ['SIN', 'SAW', 'TRI'], default 'SIN'

**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.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`

### 1.3.288 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.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`

### 1.3.289 Material(ID)

base classes — `bpy_struct`, `ID`

**class** `bpy.types.Material` (*ID*)

Material datablock to defined 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**

**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**

**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****Type** enum in ['SHADER', 'ENERGY', 'NORMAL', 'RESULT'], default 'SHADER'**diffuse\_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**halo**

Halo settings for the material

**Type** `MaterialHalo`, (readonly, never None)**invert\_z**

Renders 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**

Gives faces an artificial offset in the Z buffer for Z transparency

**Type** float in [-inf, inf], default 0.0**physics**

Game physics settings

**Type** `MaterialPhysics`, (readonly, never None)**preview\_render\_type**

Type of preview render

**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\_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**

**Type** int in [1, 511], default 0

**specular\_intensity**

**Type** float in [0, 1], default 0.0

**specular\_ior**

**Type** float in [1, 10], default 0.0

**specular\_ramp**

Color ramp used to affect specular shading

**Type** `ColorRamp`, (readonly)

**specular\_ramp\_blend**

**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**

**Type** enum in ['SHADER', 'ENERGY', 'NORMAL', 'RESULT'], default 'SHADER'

**specular\_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` 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

**Type** enum in ['Z\_TRANSPARENCY', 'RAYTRACE'], default 'Z\_TRANSPARENCY'

**type**

Material type defining how the object is rendered

**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**

Makes objects with this material appear invisible, only casting shadows (not rendered)

**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**

Replaces the object's base color with color from face assigned image textures

**Type** boolean, default False

**use\_face\_texture\_alpha**

Replaces 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**

Renders shadows as the material's alpha value, making materials transparent except for shadowed areas

**Type** boolean, default False

**use\_ray\_shadow\_bias**

Prevents 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 ray tracing calculations

**Type** boolean, default False

**use\_shadeless**

Makes this material insensitive to light or shadow

**Type** boolean, default False

**use\_shadows**

Allows this material to receive shadows

**Type** boolean, default False

**use\_sky**

Renders 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 casted 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**

Replaces object base color with vertex colors (multiplies 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.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`

## References

- `BlendData.materials`
- `Curve.materials`
- `IDMaterials.append`
- `IDMaterials.pop`
- `MainMaterials.new`
- `MainMaterials.remove`
- `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`

### 1.3.290 MaterialHalo(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.MaterialHalo` (*bpy\_struct*)  
Halo particle effect settings for a Material datablock



**add**

Sets the strength of the add effect

**Type** float in [0, 1], default 0.0

**flare\_boost**

Gives the flare extra strength

**Type** float in [0.1, 10], default 0.0

**flare\_seed**

Specifies an offset in the flare seed table

**Type** int in [0, 255], default 0

**flare\_size**

Sets the factor by which the flare is larger than the halo

**Type** float in [0.1, 25], default 0.0

**flare\_subflare\_count**

Sets the number of subflares

**Type** int in [1, 32], default 0

**flare\_subflare\_size**

Sets the dimension of the subflares, dots and circles

**Type** float in [0.1, 25], default 0.0

**hardness**

Sets the hardness of the halo

**Type** int in [0, 127], default 0

**line\_count**

Sets the number of star shaped lines rendered over the halo

**Type** int in [0, 250], default 0

**ring\_count**

Sets the number of rings rendered over the halo

**Type** int in [0, 24], default 0

**seed**

Randomizes ring dimension and line location

**Type** int in [0, 255], default 0

**size**

Sets the dimension of the halo

**Type** float in [0, 100], default 0.0

**star\_tip\_count**

Sets the number of points on the star shaped halo

**Type** int in [3, 50], default 0

**use\_extreme\_alpha**

Uses extreme alpha

**Type** boolean, default False

**use\_flare\_mode**

Renders halo as a lensflare

**Type** boolean, default False

**use\_lines**

Renders star shaped lines over halo

**Type** boolean, default False

**use\_ring**

Renders rings over halo

**Type** boolean, default False

**use\_shaded**

Lets halo receive light and shadows from external objects

**Type** boolean, default False

**use\_soft**

Softens the edges of halos at intersections with other geometry

**Type** boolean, default False

**use\_star**

Renders halo as a star

**Type** boolean, default False

**use\_texture**

Gives halo a texture

**Type** boolean, default False

**use\_vertex\_normal**

Uses 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`

### 1.3.291 MaterialPhysics(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MaterialPhysics` (*bpy\_struct*)

Physics settings for a Material datablock

**damping**

Damping of the spring force, when inside the physics distance area

**Type** float in [0, 1], default 0.0

**distance**

Distance of the physics area

**Type** float in [0, 20], default 0.0

**elasticity**

Elasticity of collisions

**Type** float in [0, 1], default 0.0

**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\_normal\_align**

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`

### 1.3.292 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**

Sets the amount 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`

### 1.3.293 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**

Sets angular index of refraction for raytraced refraction

**Type** float in [1, 3], 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`

### 1.3.294 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`

### 1.3.295 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 makes 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

**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`

### 1.3.296 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`

### 1.3.297 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

**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**

**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**

**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**

**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 objects 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

**use\_old\_bump**

Use old bump mapping (backwards compatibility option)

**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`

### 1.3.298 MaterialTextureSlots(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MaterialTextureSlots` (*bpy\_struct*)

Collection of texture slots

**classmethod** `add()`

Add a number of points to this spline.

**Returns** The newly initialized `mtx`.

**Return type** `MaterialTextureSlot`

**classmethod** `create(index)`

Add a number of points to this spline.

**Parameters**

- **index** (*int in [0, inf]*) – Index, Slot index to initialize.

**Returns** The newly initialized `mtx`.

**Return type** `MaterialTextureSlot`

**classmethod** `clear(index)`

Add a number of points to this spline.

**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`



### 1.3.299 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 [0, 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**

**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

**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**

Colour 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`

### 1.3.300 Menu(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.Menu` (*bpy\_struct*)

Editor menu containing buttons

**bl\_idname**

If this is set, the menu 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\_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*)

Prepend an 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`

### 1.3.301 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**

Defines maximum angle between face normals that ‘Auto Smooth’ will operate on

**Type** `int` in [1, 80], default 0

**edges**

Edges of the mesh

**Type** `MeshEdges` collection of `MeshEdge`, (readonly)

**faces**

Faces of the mesh

**Type** `MeshFaces` collection of `MeshFace`, (readonly)

**layers\_float**

**Type** Collection of `MeshFloatPropertyLayer`, (readonly)

**layers\_int**

**Type** Collection of `MeshIntPropertyLayer`, (readonly)

**layers\_string**

**Type** Collection of `MeshStringPropertyLayer`, (readonly)

**materials**

**Type** `IDMaterials` collection of `Material`, (readonly)

**shape\_keys**

**Type** `Key`, (readonly)

**show\_all\_edges**

Displays 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**

Displays weights created for the Bevel modifier

**Type** boolean, default False

**show\_edge\_crease**

Displays creases created for subsurf weighting

**Type** boolean, default False

**show\_edge\_seams**

Displays UV unwrapping seams

**Type** boolean, default False

**show\_edge\_sharp**

Displays sharp edges, used with the EdgeSplit modifier

**Type** boolean, default False

**show\_edges**

Displays selected edges using highlights in the 3D view and UV editor

**Type** boolean, default False

**show\_extra\_edge\_angle**

Displays the angles in the selected edges in degrees, Using global values when set in the transform panel

**Type** boolean, default False

**show\_extra\_edge\_length**

Displays selected edge lengths, Using global values when set in the transform panel

**Type** boolean, default False

**show\_extra\_face\_area**

Displays the area of selected faces, Using global values when set in the transform panel

**Type** boolean, default False

**show\_faces**

Displays all faces as shades in the 3D view and UV editor

**Type** boolean, default False

**show\_normal\_face**

Displays face normals as lines

**Type** boolean, default False

**show\_normal\_vertex**

Displays vertex normals as lines

**Type** boolean, default False

**sticky**

Sticky texture coordinates

**Type** 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**

Treats all set-smoothed faces with angles less than the specified angle as ‘smooth’ during render

**Type** boolean, default False

**use\_auto\_texspace**

Adjusts active object’s texture space automatically when transforming object

**Type** boolean, default False

**use\_mirror\_topology**

Use topology based mirroring

**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

**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` collection of `MeshTextureFaceLayer`, (readonly)

**vertex\_colors**

**Type** `VertexColors` collection of `MeshColorLayer`, (readonly)

**vertices**

Vertices of the mesh

**Type** `MeshVertices` collection of `MeshVertex`, (readonly)

**edge\_face\_count**

(readonly)

**edge\_face\_count\_dict**

(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.

**edge\_loops\_from\_edges** (*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.

**edge\_loops\_from\_faces** (*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)], ...]

return a list of edge vertex index lists

**from\_pydata** (*verts, edges, faces*)

Make a mesh from a list of verts/edges/faces Until we have a nicer way to make geometry, use this.

## Inherited Properties

- bpy\_struct.id\_data
- ID.name
- ID.use\_fake\_user
- 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

## References

- BlendData.meshes
- EditObjectActuator.mesh
- MainMeshes.new
- MainMeshes.remove



- `Mesh.texco_mesh`
- `Mesh.texture_mesh`
- `Object.create_mesh`

### 1.3.302 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`

### 1.3.303 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** Collection of `MeshColor`, (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.vertex_colors`
- `VertexColors.active`
- `VertexColors.new`

### 1.3.304 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.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`

### 1.3.305 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`

### 1.3.306 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`

### 1.3.307 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`

### 1.3.308 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`

### 1.3.309 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`

### 1.3.310 MeshFloatPropertyLayer(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MeshFloatPropertyLayer` (*bpy\_struct*)  
User defined layer of floating pointer number values

**data**

**Type** 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

- `Mesh.layers_float`

### 1.3.311 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`

### 1.3.312 MeshIntPropertyLayer(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MeshIntPropertyLayer` (*bpy\_struct*)

User defined layer of integer number values

#### **data**

**Type** 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

- `Mesh.layers_int`

### 1.3.313 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`

### 1.3.314 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`

### 1.3.315 MeshStringPropertyLayer(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MeshStringPropertyLayer` (*bpy\_struct*)

User defined layer of string text values

#### **data**

**Type** 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`

### 1.3.316 MeshTextureFace(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MeshTextureFace` (*bpy\_struct*)

UV mapping, texturing and game engine data for a face

**blend\_type**

Transparency blending mode

**Type** enum in ['OPAQUE', 'ADD', 'ALPHA', 'CLIPALPHA'], default 'OPAQUE'

**hide**

Make face invisible

**Type** boolean, default False

**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)

**use\_alpha\_sort**

Enable sorting of faces for correct alpha drawing (slow, use Clip Alpha instead when possible)

**Type** boolean, default False

**use\_billboard**

Billboard with Z-axis constraint

**Type** boolean, default False

**use\_bitmap\_text**

Enable bitmap text on face

**Type** boolean, default False

**use\_blend\_shared**

Blend vertex colors across face when vertices are shared

**Type** boolean, default False

**use\_collision**

Use face for collision and ray-sensor detection

**Type** boolean, default False**use\_halo**

Screen aligned billboard

**Type** boolean, default False**use\_image**

Render face with texture

**Type** boolean, default False**use\_light**

Use light for face

**Type** boolean, default False**use\_object\_color**

Use ObColor instead of vertex colors

**Type** boolean, default False**use\_shadow\_cast**

Face is used for shadow

**Type** boolean, default False**use\_twoside**

Render face two-sided

**Type** boolean, default 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`

### 1.3.317 MeshTextureFaceLayer(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.MeshTextureFaceLayer` (*bpy\_struct*)  
Layer of texture faces in a Mesh datablock

**active**

Sets the layer as active for display and editing

**Type** boolean, default False

**active\_clone**

Sets the layer as active for cloning

**Type** boolean, default False

**active\_render**

Sets the layer as active for rendering

**Type** boolean, default False

**data**

**Type** Collection of `MeshTextureFace`, (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.uv_texture_clone`
- `Mesh.uv_texture_stencil`
- `Mesh.uv_textures`
- `UVTextures.active`
- `UVTextures.new`

### 1.3.318 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** 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 [-inf, inf], 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`

### 1.3.319 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`

### 1.3.320 MessageActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.MessageActuator` (*Actuator*)  
 Actuator to ..

**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`

### 1.3.321 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`

### 1.3.322 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` collection of `MetaElement`, (readonly)

**materials**

**Type** `IDMaterials` 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

**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.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`

## References

- `BlendData.metaballs`
- `MainMetaBalls.new`
- `MainMetaBalls.remove`

### 1.3.323 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 metaelement.

**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`

### 1.3.324 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**

**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`

### 1.3.325 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** Collection of `Sequence`, (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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`

- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.326 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\_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.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`

### 1.3.327 Modifier(`bpy_struct`)

base class — `bpy_struct`

subclasses — `FluidSimulationModifier`, `BevelModifier`, `SolidifyModifier`, `SmokeModifier`, `UVProjectModifier`, `DecimateModifier`, `ExplodeModifier`, `SmoothModifier`, `SoftBodyModifier`, `BooleanModifier`, `ArrayModifier`, `LatticeModifier`, `BuildModifier`, `ClothModifier`, `ParticleSystemModifier`, `SubsurfModifier`, `CurveModifier`, `ScrewModifier`, `MaskModifier`, `ShrinkwrapModifier`, `CollisionModifier`, `CastModifier`, `WaveModifier`, `ParticleInstanceModifier`, `SurfaceModifier`, `SimpleDeformModifier`, `DisplaceModifier`, `ArmatureModifier`, `MeshDeformModifier`, `HookModifier`, `EdgeSplitModifier`, `MultiresModifier`, `MirrorModifier`

**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 ['ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE\_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SOLIDIFY', 'SUBSURF', 'UV\_PROJECT', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH\_DEFORM', 'SHRINKWRAP', 'SIMPLE\_DEFORM', 'SMOOTH', 'WAVE', 'CLOTH', 'COLLISION', 'EXPLODE', 'FLUID\_SIMULATION', 'PARTICLE\_INSTANCE', 'PARTICLE\_SYSTEM', 'SMOKE', 'SOFT\_BODY', 'SURFACE'], default 'ARRAY', (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.modifiers`
- `ObjectModifiers.new`
- `ObjectModifiers.remove`
- `UILayout.template_modifier`

### 1.3.328 MotionPath(*bpy\_struct*)

base class — *bpy\_struct*

**class** `bpy.types.MotionPath` (*bpy\_struct*)

Cache of the worldspace 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** 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`

### 1.3.329 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`

### 1.3.330 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`

### 1.3.331 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)

**filepath**

**Type** `string`, default `""`

**mpeg\_preseek**

For MPEG movies, preseek this many frames

**Type** `int` in `[0, 50]`, 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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.332 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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.333 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**

**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)

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.334 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**

**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

**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**

**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.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`

### 1.3.335 NET\_RENDER(RenderEngine)

base classes — `bpy_struct`, `RenderEngine`

**class** `bpy.types.NET_RENDER` (*RenderEngine*)

**render** (*scene*)

**render\_client** (*scene*)

**render\_master** (*scene*)

**render\_slave** (*scene*)

## Inherited Properties

- `bpy_struct.id_data`
- `RenderEngine.bl_idname`
- `RenderEngine.bl_label`
- `RenderEngine.bl_use_postprocess`
- `RenderEngine.bl_use_preview`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`
- `RenderEngine.render`
- `RenderEngine.begin_result`
- `RenderEngine.update_result`
- `RenderEngine.end_result`
- `RenderEngine.test_break`
- `RenderEngine.update_stats`

### 1.3.336 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`

### 1.3.337 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

**Type** string, default ""

**reset\_distance**

**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`

### 1.3.338 NetRenderJob(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

class `bpy.types.NetRenderJob` (*IDPropertyGroup*)

**name**

**Type** string, default ""

#### Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

#### References

- `NetRenderSettings.jobs`

### 1.3.339 NetRenderSettings(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

class `bpy.types.NetRenderSettings` (*IDPropertyGroup*)

**active\_blacklisted\_slave\_index**

**Type** int in [-1, 65535], default -1

**active\_job\_index**

**Type** int in [-1, 65535], default -1

**active\_slave\_index**

**Type** int in [-1, 65535], default -1

**chunks**

Number of frame to dispatch to each slave in one chunk

**Type** int in [1, 65535], default 5

**job\_category**

Category of the job

**Type** string, default ""

**job\_id**

id of the last sent render job

**Type** string, default ""

**job\_name**

Name of the job

**Type** string, default "[default]"

**jobs**

**Type** Collection of `NetRenderJob`, (readonly)

**mode**

Mode of operation of this instance

**Type** enum in ['RENDER\_CLIENT', 'RENDER\_MASTER', 'RENDER\_SLAVE'], default 'RENDER\_CLIENT'

**path**

Path for temporary files

**Type** string, default "/tmp/"

**priority**

Priority of the job

**Type** int in [1, 10], default 1

**server\_address**

IP or name of the master render server

**Type** string, default "[default]"

**server\_port**

port of the master render server

**Type** int in [1, 65535], default 8000

#### **slaves**

**Type** Collection of `NetRenderSlave`, (readonly)

#### **slaves\_blacklist**

**Type** Collection of `NetRenderSlave`, (readonly)

#### **use\_master\_broadcast**

broadcast master server address on local network

**Type** boolean, default True

#### **use\_master\_clear**

delete saved files on exit

**Type** boolean, default False

#### **use\_slave\_clear**

delete downloaded files on exit

**Type** boolean, default True

#### **use\_slave\_output\_log**

Output render text log to console as well as sending it to the master

**Type** boolean, default True

#### **use\_slave\_thumb**

Generate thumbnails on slaves instead of master

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

## References

- `Scene.network_render`

### 1.3.340 NetRenderSlave(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

class `bpy.types.NetRenderSlave` (*IDPropertyGroup*)

**name**

**Type** string, default ""

## Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

## References

- `NetRenderSettings.slaves`
- `NetRenderSettings.slaves_blacklist`

### 1.3.341 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

**Type** enum in ['REPLACE', 'ADD', 'SUBTRACT', 'MULITPLY'], default 'REPLACE'

**extrapolation**

Action to take for gaps past the strip extents

**Type** enum in ['NOTHING', 'HOLD', 'HOLD\_FORWARD'], default 'HOLD'

**fcurves**

F-Curves for controlling the strip's influence and timing

**Type** 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** 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** Collection of `NlaStrip`, (readonly)

**type**

Type of NLA Strip

**Type** enum in ['CLIP', 'TRANSITION', 'META'], 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`
- `NlaTrack.strips`

### 1.3.342 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** 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`

### 1.3.343 Node(`bpy_struct`)

base class — `bpy_struct`

subclasses — `TextureNode`, `ShaderNode`, `CompositorNode`, `NodeGroup`

**class** `bpy.types.Node` (*`bpy_struct`*)

Node in a node tree

**inputs**

**Type** Collection of `NodeSocket`, (readonly)

**location**

**Type** float array of 2 items in [-10000, 10000], default (0.0, 0.0)

**name**

Node name

**Type** string, default ""

**outputs****Type** Collection of `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**

- `NodeTree.nodes`

**1.3.344 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.location`
- `Node.outputs`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.345 NodeSocket(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.NodeSocket` (*bpy\_struct*)  
Input or output socket of a node

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

## References

- `Node.inputs`
- `Node.outputs`

### 1.3.346 NodeTree(ID)

base classes — `bpy_struct`, `ID`

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`

#### **nodes**

**Type** Collection of `Node`, (readonly)

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.node_groups`
- `Material.node_tree`
- `NodeGroup.node_tree`
- `Scene.node_tree`
- `SpaceNodeEditor.node_tree`
- `Texture.node_tree`

### 1.3.347 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.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`

### 1.3.348 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`

### 1.3.349 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**

Objects bound box in object-space coordinates

**Type** float array of 24 items in `[-inf, inf]`, default `(0.0, 0.0)`, (readonly)

**collision**

Settings for using the objects 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` 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

**Type** enum in `['BOX', 'SPHERE', 'CYLINDER', 'CONE', 'POLYHEDRON', 'CAPSULE']`, default `'BOX'`

**draw\_type**

Maximum draw type to display object with in 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** Collection of DupliObject, (readonly)

**dupli\_type**

If not None, object duplication method to use

**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 ['ARROWS', 'SINGLE\_ARROW', 'PLAIN\_AXES', 'CIRCLE', 'CUBE', 'SPHERE', 'CONE'], default 'ARROWS'

**field**

Settings for using the objects 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  $[-\text{inf}, \text{inf}]$ , 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** Collection of `MaterialSlot`, (readonly)

**matrix\_local**

Parent relative transformation matrix

**Type** float array of 16 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, 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  $[-\text{inf}, \text{inf}]$ , 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` 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

**Type** `enum` in [`'OBJECT'`, `'CURVE'`, `'KEY'`, `'ARMATURE'`, `'LATTICE'`, `'VERTEX'`, `'VERTEX_3'`, `'BONE'`], default `'OBJECT'`**parent\_vertices**

Indices of vertices in cases of a vertex parenting relation

**Type** `int` array of 3 items in `[0, inf]`, default `(0, 0, 0)`, (readonly)**particle\_systems**

Particle systems emitted from the object

**Type** `ParticleSystem` 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`, (readonly)**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****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**

Displays the object's origin and axis

**Type** boolean, default False**show\_bounds**

Displays the object's bounds

**Type** boolean, default False**show\_name**

Displays 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**

Displays the object's texture space

**Type** boolean, default False**show\_transparent**

Enables transparent materials for the object (Mesh only)

**Type** boolean, default False**show\_wire**

Adds the object's wireframe over solid drawing

**Type** boolean, default False**show\_x\_ray**

Makes the object draw in front of others

**Type** boolean, default False**soft\_body**

Settings for soft body simulation

**Type** `SoftBodySettings`, (readonly)**time\_offset**

Animation offset in frames for F-Curve and dupligroup instances

**Type** float in [-300000, 300000], default 0.0**track\_axis**

Axis that points in 'forward' direction

**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 ['EMPTY', 'MESH', 'CURVE', 'SURFACE', 'TEXT', 'META', 'LAMP', 'CAMERA', 'LATTICE', 'ARMATURE'], default 'EMPTY', (readonly)

**up\_axis**

Axis that points in the upward direction

**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 frame

**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

**Type** boolean, default False

**use\_time\_offset\_add\_parent**

Add the parents time offset value

**Type** boolean, default False

**use\_time\_offset\_edit**

Use time offset when inserting keys and display time offset for F-Curve and action views

**Type** boolean, default False

**use\_time\_offset\_parent**

Apply the time offset to this objects parent relationship

**Type** boolean, default False

**use\_time\_offset\_particle**

Let the time offset work on the particle effect

**Type** boolean, default False

**vertex\_groups**

Vertex groups of the object

**Type** `VertexGroups` 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)

**create\_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.

**Returns** Mesh created from object, remove it if it is only used for export.

**Return type** [Mesh](#)

**create\_dupli\_list** (*scene*)

Create a list of dupli objects for this object, needs to be freed manually with `free_dupli_list`.

**Parameters**

- **scene** (*Scene*, (never None)) – Scene within which to evaluate duplis.

**free\_dupli\_list** ()

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](#)

**add\_shape\_key** (*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]

**update** (*scene, object=True, data=True, time=True*)

Tag the object to update its display data.

**Parameters**

- **object** (*boolean, (optional)*) – Tag the object for updating

- **data** (*boolean, (optional)*) – Tag the objects display data for updating
- **time** (*boolean, (optional)*) – Tag the object time related data for updating

**is\_visible** (*scene*)

Determine if object is visible in a given scene.

**Returns** Object visibility.

**Return type** boolean

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `ActionConstraint.target`
- `ArmatureActuator.secondary_target`
- `ArmatureActuator.target`
- `ArmatureModifier.object`
- `ArrayModifier.curve`
- `ArrayModifier.end_cap`
- `ArrayModifier.offset_object`

- `ArrayModifier.start_cap`
- `BlendData.objects`
- `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_coordinate_object`
- `DupliObject.object`
- `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`
- `MainObjects.new`
- `MainObjects.remove`
- `MaskModifier.armature`
- `MaterialTextureSlot.object`
- `MeshDeformModifier.object`
- `MirrorModifier.mirror_object`
- `Object.find_armature`
- `Object.parent`
- `Object.proxy`
- `Object.proxy_group`
- `ObjectActuator.reference_object`
- `ObjectBase.object`
- `ParentActuator.object`
- `ParticleEdit.object`
- `ParticleInstanceModifier.object`
- `ParticleSettings.billboard_object`

- `ParticleSystem.dupli_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`
- `StretchToConstraint.target`
- `TextCurve.follow_curve`
- `TimelineMarker.camera`
- `ToolSettings.etch_template`
- `TrackToConstraint.target`
- `TransformConstraint.target`
- `UVProjector.object`
- `VoxelData.domain_object`
- `WaveModifier.start_position_object`
- `WaveModifier.texture_coords_object`
- `WorldTextureSlot.object`

### 1.3.350 ObjectActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.ObjectActuator` (*Actuator*)  
Actuator to control the object movement

**angular\_velocity**

Sets the 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**

Sets the force

**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

**force\_max\_x**

Set the upper limit for force

**Type** float in [-inf, inf], default 0.0

**force\_max\_y**

Set the upper limit for force

**Type** float in [-inf, inf], default 0.0

**force\_max\_z**

Set the upper limit for force

**Type** float in [-inf, inf], default 0.0

**force\_min\_x**

Set the lower limit for force

**Type** float in [-inf, inf], default 0.0

**force\_min\_y**

Set the lower limit for force

**Type** float in [-inf, inf], default 0.0

**force\_min\_z**

Set the lower limit for 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**

Sets the 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**

Sets the location

**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

**offset\_rotation**

Sets the 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**

Sets the torque

**Type** float array of 3 items in `[-inf, 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`

### 1.3.351 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`

### 1.3.352 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* [`'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.



**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`

### 1.3.353 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* ['ARRAY', 'BEVEL', 'BOOLEAN', 'BUILD', 'DECIMATE', 'EDGE\_SPLIT', 'MASK', 'MIRROR', 'MULTIRES', 'SCREW', 'SOLIDIFY', 'SUBSURF', 'UV\_PROJECT', 'ARMATURE', 'CAST', 'CURVE', 'DISPLACE', 'HOOK', 'LATTICE', 'MESH\_DEFORM', 'SHRINKWRAP', 'SIMPLE\_DEFORM', 'SMOOTH', 'WAVE', 'CLOTH', 'COLLISION', 'EXPLODE', 'FLUID\_SIMULATION', '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`

### 1.3.354 `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**

**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

**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`

### 1.3.355 Operator(`bpy_struct`)

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

**Type** enum in ['REGISTER', 'UNDO', 'BLOCKING', 'MACRO', 'GRAB\_POINTER'], 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 in ['DEBUG', 'INFO', 'OPERATOR', 'WARNING', 'ERROR', 'ERROR\_INVALID\_INPUT', 'ERROR\_INVALID\_CONTEXT', 'ERROR\_OUT\_OF\_MEMORY']*) – Type
- **message** (*string*) – Report Message

**classmethod** `poll` (*context=None*)

Test if the operator can be called or not.

**Return type** boolean

**execute** (*context=None*)

Execute the operator.

**Returns** result

**Return type** enum in ['RUNNING\_MODAL', 'CANCELLED', 'FINISHED', 'PASS\_THROUGH']

**check** (*context=None*)

Check the operator settings.

**Returns** result

**Return type** boolean

**invoke** (*context=None, event=None*)

Invoke the operator.

**Returns** result

**Return type** enum in ['RUNNING\_MODAL', 'CANCELLED', 'FINISHED', 'PASS\_THROUGH']

**modal** (*context=None, event=None*)

Modal operator function.

**Returns** result

**Return type** enum in ['RUNNING\_MODAL', 'CANCELLED', 'FINISHED', 'PASS\_THROUGH']

**draw** (*context=None*)

Draw function for the 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

- `SpaceFileBrowser.operator`
- `WindowManager.add_fileselect`

- `WindowManager.add_modal_handler`
- `WindowManager.invoke_popup`
- `WindowManager.invoke_props_dialog`
- `WindowManager.invoke_props_popup`
- `WindowManager.invoke_search_popup`
- `WindowManager.operators`

### 1.3.356 `OperatorFileListElement`(`IDPropertyGroup`)

base classes — `bpy_struct`, `IDPropertyGroup`

**class** `bpy.types.OperatorFileListElement` (*`IDPropertyGroup`*)

**name**

the name of a file or directory within a file list

**Type** string, default ""

### Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

### 1.3.357 `OperatorMousePath`(`IDPropertyGroup`)

base classes — `bpy_struct`, `IDPropertyGroup`

**class** `bpy.types.OperatorMousePath` (*`IDPropertyGroup`*)

Mouse path values for operators that record such paths

**loc**

Mouse location

**Type** float array of 2 items in  $[-\text{inf}, \text{inf}]$ , default (0.0, 0.0)

**time**

Time of mouse location

**Type** float in  $[-\text{inf}, \text{inf}]$ , default 0.0

## Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

### 1.3.358 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`
- `OperatorTypeMacro.properties`
- `UILayout.operator`

### 1.3.359 OperatorStrokeElement(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

**class** `bpy.types.OperatorStrokeElement` (*IDPropertyGroup*)

#### **location**

**Type** float array of 3 items in  $[-\text{inf}, \text{inf}]$ , 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`
- `IDPropertyGroup.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`

### 1.3.360 OperatorTypeMacro(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.OperatorTypeMacro` (*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`

### 1.3.361 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`

### 1.3.362 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

**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`

**1.3.363 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`

### 1.3.364 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`

### 1.3.365 Panel(`bpy_struct`)

base class — `bpy_struct`

subclasses — `InputKeyMapPanel`

**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

**Type** enum 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', 'AUDIO\_WINDOW', 'DOPESHEET\_EDITOR', 'NLA\_EDITOR',

‘SCRIPTS\_WINDOW’, ‘TIMELINE’, ‘NODE\_EDITOR’, ‘LOGIC\_EDITOR’, ‘CONSOLE’, ‘USER\_PREFERENCES’], 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*)

Prepend an draw function to this menu, takes the same arguments as the menus draw function.

**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`

### 1.3.366 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 (only if not compound)

**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`

### 1.3.367 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

**is\_exist**

**Type** boolean, default False, (readonly)

**is\_hair**

**Type** Collection of `ParticleHairKey`, (readonly)

**is\_visible**

**Type** boolean, default False, (readonly)

**keys**

**Type** Collection of `ParticleKey`, (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)

**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`

### 1.3.368 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****Type** enum in ['GROW', 'SHRINK'], default 'GROW'

**puff\_mode**

**Type** enum in ['ADD', 'SUB'], default 'ADD'

**size**

Brush size

**Type** int in [1, inf], default 0

**steps**

Brush steps

**Type** int in [1, inf], 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`

### 1.3.369 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, inf], 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`

### 1.3.370 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, inf], 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

**Type** enum in ['PATH', 'POINT', 'TIP'], default 'PATH'

**show\_particles**

Draw actual particles

**Type** boolean, default False

**tool**

**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`

### 1.3.371 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`

### 1.3.372 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.is_hair`

### 1.3.373 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.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`

### 1.3.374 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 quaterion

**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  $[-\text{inf}, \text{inf}]$ , 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.keys`

### 1.3.375 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  $[0, \text{inf}]$ , 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

**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', 'TIME', '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\_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

**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\_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', 'PARTICLES', 'FACES'], 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

**count**

Total number of particles

**Type** int in [0, 10000000], default 0

**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 ['JIT', 'RAND', 'GRID'], default 'JIT'

#### **drag\_factor**

Specify the amount of air-drag

**Type** float in [0, 1], default 0.0

#### **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, 7], 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** Collection of [ParticleDupliWeight](#), (readonly)

#### **effect\_hair**

Hair stiffness for effectors

**Type** float in [0, 1], default 0.0

#### **effector\_weights**

**Type** [EffectorWeights](#), (readonly)

#### **emit\_from**

Where to emit particles from

**Type** enum in ['VERT', 'FACE', 'VOLUME', 'PARTICLE'], 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\_resolution**

The resolution of the particle grid

**Type** int in [1, 46], default 0

**hair\_step**

Number of hair segments

**Type** int in [2, 50], default 0

**integrator**

Select physics integrator type

**Type** enum in ['EULER', 'VERLET', 'MIDPOINT', 'RK4'], default 'EULER'

**invert\_grid**

Invert what is considered object and what is not

**Type** boolean, default False

**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, inf], 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\_axis**

Which axis to use for offset

**Type** enum in ['X', 'Y', 'Z'], default 'X'

**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, 16], 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'

**reaction\_shape**

Power of reaction strength dependence on distance to target

**Type** float in [0, 10], default 0.0

**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

**render\_step**

How many steps paths are rendered with (power of 2)

**Type** int in [0, 9], 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**

Particles initial rotation

**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\_material\_color**

Draw particles using material's diffuse color

**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

**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

**time\_tweak**

A multiplier for physics timestep (1.0 means one frame = 1/25 seconds)

**Type** float in [0, 100], default 0.0

**trail\_count**

Number of trail particles

**Type** int in [1, 100000], default 0

**type**

**Type** enum in ['EMITTER', 'HAIR'], default 'EMITTER'

**use\_absolute\_path\_time**

Path timing is in absolute frames

**Type** boolean, default False

**use\_animate\_branching**

Animate branching

**Type** boolean, default False

**use\_branching**

Branch child paths from each other

**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\_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\_symmetric\_branching**

Start and end points are the same

**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.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`

## References

- `BlendData.particles`
- `MainParticles.new`
- `MainParticles.remove`
- `ParticleSystem.settings`

### 1.3.376 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 Collection of [ChildParticle](#), (readonly)
- cloth**  
Cloth dynamics for hair  
Type [ClothModifier](#), (readonly, never None)
- 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** 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, inf], 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** 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

- `Object.particle_systems`
- `ParticleSystemModifier.particle_system`
- `ParticleSystems.active`
- `PointDensity.particle_system`
- `SmokeFlowSettings.particle_system`

### 1.3.377 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.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`

### 1.3.378 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`

### 1.3.379 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`

### 1.3.380 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

**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.is\_valid
- Constraint.show\_expanded
- Constraint.influence
- Constraint.error\_location
- Constraint.owner\_space
- Constraint.is\_proxy\_local
- Constraint.error\_rotation
- Constraint.target\_space
- Constraint.type

## Inherited Functions

- bpy\_struct.as\_pointer
- bpy\_struct.callback\_add
- bpy\_struct.callback\_remove
- bpy\_struct.driver\_add
- bpy\_struct.driver\_remove
- bpy\_struct.get
- bpy\_struct.is\_property\_hidden
- bpy\_struct.is\_property\_set
- bpy\_struct.items
- bpy\_struct.keyframe\_delete
- bpy\_struct.keyframe\_insert
- bpy\_struct.keys

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.381 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`
- `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`

### 1.3.382 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.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`

### 1.3.383 PointCache(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.PointCache` (*bpy\_struct*)

Point cache for physics simulations

**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` 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`
- `ParticleSystem.point_cache`
- `PointCache.point_caches`
- `SmokeDomainSettings.point_cache_high`
- `SmokeDomainSettings.point_cache_low`
- `SoftBodyModifier.point_cache`

### 1.3.384 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`

### 1.3.385 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

**Type** enum in ['CONSTANT', 'PARTICLE\_AGE', 'PARTICLE\_SPEED', 'PARTICLE\_VELOCITY'], default 'CONSTANT'

**falloff**

Method of attenuating density by distance from the point

**Type** enum in ['STANDARD', 'SMOOTH', 'SOFT', 'CONSTANT', 'ROOT'], default 'STANDARD'

**falloff\_soft**

Softness of the 'soft' falloff option

**Type** float in [0.01, inf], default 0.0

**noise\_basis**

Noise formula used for turbulence

**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**

Co-ordinate 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

**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, inf], default 0

**turbulence\_influence**

Method for driving added turbulent noise

**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\_turbulence**

Add directed noise to the density at render-time

**Type** boolean, default False

**vertex\_cache\_space**

Co-ordinate 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`

### 1.3.386 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.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`

### 1.3.387 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

**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.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.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.388 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.srna`
- `Property.description`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_runtime`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `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`

### 1.3.389 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` collection of `BoneGroup`, (readonly)

**bones**

Individual pose bones for the armature

**Type** 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

**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`

### 1.3.390 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 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 for this channel

**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)

**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)

**matrix\_local**

Matrix representing the parent relative location, scale and rotation. Provides an alternative access to these properties.

**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)

**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**

**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**

**Type** float array of 3 items in [-inf, inf], default (1.0, 1.0, 1.0)

**select**

**Type** boolean, default False

**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 basenames 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`

### 1.3.391 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* [`'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.

**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`

### 1.3.392 PoseTemplate(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

class `bpy.types.PoseTemplate` (*IDPropertyGroup*)

**name**

**Type** string, default ""

## Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

## References

- `PoseTemplateSettings.templates`

### 1.3.393 PoseTemplateSettings(IDPropertyGroup)

base classes — `bpy_struct`, `IDPropertyGroup`

**class** `bpy.types.PoseTemplateSettings` (*IDPropertyGroup*)

**active\_template\_index**

**Type** int in [-1, 65535], default -1

**templates**

**Type** Collection of `PoseTemplate`, (readonly)

**use\_generate\_deform\_rig**

Create a copy of the metarig, constrained by the generated rig

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `IDPropertyGroup.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`

## References

- `Scene.pose_templates`

### 1.3.394 Property(`bpy_struct`)

base class — `bpy_struct`

subclasses — `PointerProperty`, `EnumProperty`, `IntProperty`, `CollectionProperty`, `BooleanProperty`, `FloatProperty`, `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\_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 is editable through RNA

**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', '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`

### 1.3.395 PropertyActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.PropertyActuator` (*Actuator*)

Actuator to handle properties

**mode**

**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 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`

### 1.3.396 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

### 1.3.397 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** 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`

- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.398 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`

### 1.3.399 RGBANodeSocket(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.RGBANodeSocket` (*bpy\_struct*)

Input or output socket of a node

**default\_value**

Default value of the socket when no link is attached

**Type** float array of 4 items in `[-inf, inf]`, default `(0.0, 0.0, 0.0, 0.0)`

**name**

Socket 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`

### 1.3.400 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

**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 'YAXIS'

**distance**

Depth of the radar cone

**Type** float in [0, 10000], default 0.0

**property**

Only look for Objects with this property

**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`

### 1.3.401 RandomActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.RandomActuator` (*Actuator*)

Actuator to ..

**chance**

Pick a number between 0 and 1. Success if you stay below this value

**Type** float in [0, 1], default 0.0

**distribution**

Choose the type of distribution

**Type** enum in ['RESTART', 'SET', 'CAMERA', 'ADDFRONT', 'ADDBACK', 'REMOVE', 'SUSPEND', 'RESUME', 'RESUME', 'RESUME'], default 'RESTART'

**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`

### 1.3.402 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`

### 1.3.403 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

**Type** string, default ""

**property**

Only look for Objects with this property

**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

**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`

### 1.3.404 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)

### Inherited Properties

- `bpy_struct.id_data`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.405 RegionView3D(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.RegionView3D` (*bpy\_struct*)

3D View region data

**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\_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), (readonly)

**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`

### 1.3.406 RenderEngine(bpy\_struct)

base class — `bpy_struct`

subclasses — `NET_RENDER`

**class** `bpy.types.RenderEngine` (*bpy\_struct*)

Render engine

**b1\_idname**

**Type** string, default ""

**b1\_label**

**Type** string, default ""

**b1\_use\_postprocess**

**Type** boolean, default False

**b1\_use\_preview**

**Type** boolean, default False

**render** (*scene=None*)

Render scene into an image.

**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

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`

- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.407 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

**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** 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\_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*)

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

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.408 RenderLayers(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.RenderLayers` (*bpy\_struct*)

Collection of render layers

**active**

Active Render Layer

**Type** `SceneRenderLayer`

**active\_index**

Active index in render layer array

**Type** `int` in `[-32768, 32767]`, 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

- `RenderSettings.layers`

### 1.3.409 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'], 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`



### 1.3.410 RenderResult(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.RenderResult` (*bpy\_struct*)

Result of rendering, including all layers and passes

**layers**

**Type** 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`

### 1.3.411 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

**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, 32], default 0

**bake\_normal\_space**

Choose normal space for baking

**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

**Type** enum in ['AUTO', 'FIXED', 'FIXED\_ALT'], default 'AUTO'

**bake\_type**

Choose shading information to bake into the image

**Type** enum in ['FULL', 'AO', 'SHADOW', 'NORMALS', 'TEXTURE', 'DISPLACEMENT'], default 'FULL'

**border\_max\_x**

Sets maximum X value for the render border

**Type** float in [0, 1], default 0.0

**border\_max\_y**

Sets maximum Y value for the render border

**Type** float in [0, 1], default 0.0

**border\_min\_x**

Sets minimum X value to for the render border

**Type** float in [0, 1], default 0.0

**border\_min\_y**

Sets minimum Y value for the render border

**Type** float in [0, 1], default 0.0

**cinéon\_black**

Log conversion reference blackpoint

**Type** int in [0, 1024], default 0

**cinéon\_gamma**

Log conversion gamma

**Type** float in [0, 10], default 0.0

**cinéon\_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 + alpha channels

**Type** enum in ['BW', 'RGB', 'RGBA'], default 'BW'

**display\_mode**

Select where rendered images will be displayed

**Type** enum in ['SCREEN', 'AREA', 'WINDOW'], 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**

**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

**Type** enum in ['BLENDER\_RENDER'], default 'BLENDER\_RENDER'

**field\_order**

Order of video fields. Select which lines get rendered first, to create smooth motion for TV output

**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

**Type** enum in ['BMP', 'IRIS', 'PNG', 'JPEG', 'TARGA', 'TARGA\_RAW', 'AVI\_JPEG', 'AVI\_RAW', 'FRAMESERVER'], 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**

Specify how many frames the Map Old will last

**Type** int in [1, 900], default 0

**frame\_map\_old**

Specify 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](#) 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

**Type** enum in ['BOX', 'TENT', 'QUADRATIC', 'CUBIC', 'CATMULLROM', 'GAUSSIAN', 'MITCHELL'], default 'BOX'

**raytrace\_method**

Type of raytrace accelerator structure

**Type** enum in ['AUTO', 'OCTREE', 'BLIBVH', 'VBVH', 'SIMD\_SVBVH', 'SIMD\_QBVH'], default 'AUTO'

**resolution\_percentage**

Percentage scale for render resolution

**Type** int in [0, 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

**Type** enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED'], default 'BOUNDBOX'

**sequencer\_gl\_render**

Method to draw in the sequencer view

**Type** enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED'], default 'BOUNDBOX'

**simplify\_ao\_sss**

Global approximate AA 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

**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\_backbuf**

Render backbuffer image

**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\_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, 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\_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 filename of the .blend file in image metadata

**Type** boolean, default False

**use\_stamp\_frame**

Include the frame number 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 the stamp image

**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 render frame 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 Name, the resulting filename 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`

### 1.3.412 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\_max**

**Type** float array of 6 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

**limit\_min**

**Type** float array of 6 items in [-inf, inf], default (0.0, 0.0, 0.0, 0.0, 0.0, 0.0)

**pivot\_type**

**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\_linked\_collision**

Disable collision between linked bodies

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.413 SPHFluidSettings(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.SPHFluidSettings` (*bpy\_struct*)

Settings for particle fluids physics

**buoyancy**

**Type** float in [0, 1], default 0.0

**fluid\_radius**

Fluid interaction Radius

**Type** float in [0, 2], default 0.0**rest\_density**

Density

**Type** float in [0, 100], default 0.0**rest\_length**

The Spring Rest Length (factor of interaction radius)

**Type** float in [0, 1], default 0.0**spring\_force**

Spring force constant

**Type** float in [0, 1], default 0.0**stiffness**

Constant K - Stiffness

**Type** float in [0, 100], default 0.0**stiffness\_near**

Repulsion factor: stiffness\_knear

**Type** float in [0, 100], default 0.0**viscosity\_beta**

Square viscosity factor

**Type** float in [0, 100], default 0.0**viscosity\_omega**

Linear viscosity

**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

- `ParticleSettings.fluid`

### 1.3.414 Scene(ID)

base classes — `bpy_struct`, `ID`

**class** `bpy.types.Scene` (*ID*)

Scene consisting objects and defining time and render related settings

**animation\_data**

Animation data for this datablock

**Type** `AnimData`, (readonly)

**audio\_distance\_model**

Distance model for distance attenuation calculation

**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

**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**

**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

#### **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**

Indicates 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` collection of `KeyingSet`, (readonly)

#### **keying\_sets\_all**

All Keying Sets available for use (Builtins and Absolute Keying Sets for this Scene)

**Type** `KeyingSetsAll` 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)

#### **network\_render**

Network Render Settings

**Type** `NetRenderSettings`, (readonly)

#### **node\_tree**

Compositing node tree

**Type** `NodeTree`, (readonly)

#### **object\_bases**

**Type** `SceneBases` collection of `ObjectBase`, (readonly)

#### **objects**

**Type** `SceneObjects` collection of `Object`, (readonly)

**orientations**

**Type** Collection of `TransformOrientation`, (readonly)

**pose\_templates**

Pose Template Settings

**Type** `PoseTemplateSettings`, (readonly)

**render**

**Type** `RenderSettings`, (readonly, never None)

**sequence\_editor**

**Type** `SequenceEditor`, (readonly)

**sync\_mode**

How to sync playback

**Type** enum in ['NONE', 'FRAME\_DROP', 'AUDIO\_SYNC'], default 'NONE'

**timeline\_markers**

Markers used in all timelines for the current scene

**Type** `TimelineMarkers` 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 define 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.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`

## References

- `BlendData.scenes`
- `CompositorNodeRLayers.scene`
- `Context.scene`
- `Image.save_render`
- `MainScenes.new`
- `MainScenes.remove`
- `Object.create_dupli_list`
- `Object.create_mesh`
- `Object.is_visible`
- `Object.update`
- `RenderEngine.render`
- `Scene.background_set`
- `SceneActuator.scene`
- `SceneSequence.scene`
- `Screen.scene`

### 1.3.415 SceneActuator(Actuator)

base classes — `bpy_struct`, `Actuator`

**class** `bpy.types.SceneActuator` (*Actuator*)

Actuator to ..

**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**

Set the 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`

### 1.3.416 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`

### 1.3.417 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**

Displays 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**

The 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 colour of the bars

**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

**frame\_type**

Select the type of Framing you want

**Type** enum in ['LETTERBOX', 'EXTEND', 'SCALE'], default 'LETTERBOX'

**frequency**

Displays clock frequency of fullscreen display

**Type** int in [4, 2000], default 0

**logic\_step\_max**

Sets the 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

**Type** enum in ['TEXTURE\_FACE', 'MULTITEXTURE', 'GLSL'], default 'TEXTURE\_FACE'

**occlusion\_culling\_resolution**

The size of the occlusion buffer in pixel, use higher value for better precision (slower)

**Type** float in [128, 1024], default 0.0

**physics\_engine**

Physics engine used for physics simulation in the game engine

**Type** enum in ['NONE', 'BULLET'], default 'NONE'

**physics\_gravity**

Gravitational constant used for physics simulation in the game engine

**Type** float in [0, 25], default 0.0

**physics\_step\_max**

Sets the 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**

Sets the number of simulation substep per physic timestep, higher value give better physics precision

**Type** int in [1, 5], default 0

**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

**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**

Starts player in a new fullscreen display

**Type** boolean, default False

**show\_physics\_visualization**

Show a visualization of physics bounds and interactions

**Type** boolean, default False

**stereo**

**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 fcurves

**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\_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`

### 1.3.418 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`) – Object to add to scene.

**Returns** The newly created base.

**Return type** `ObjectBase`

**unlink** (*object*)

Unlink object from scene.

**Parameters**

- **object** (`Object`) – 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`

### 1.3.419 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

**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\_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`
- `RenderSettings.layers`

### 1.3.420 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 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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.421 `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`

### 1.3.422 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** 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)



## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.screens`
- `Context.screen`
- `Window.screen`

### 1.3.423 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.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`

### 1.3.424 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\_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`

### 1.3.425 Sensor(`bpy_struct`)

base class — `bpy_struct`

subclasses — `RaySensor`, `PropertySensor`, `MessageSensor`, `TouchSensor`, `JoystickSensor`, `CollisionSensor`, `RadarSensor`, `DelaySensor`, `RandomSensor`, `AlwaysSensor`, `ActuatorSensor`, `MouseSensor`, `ArmatureSensor`, `KeyboardSensor`, `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`

### 1.3.426 Sequence(`bpy_struct`)

base class — `bpy_struct`

subclasses — `MulticamSequence`, `ImageSequence`, `SceneSequence`, `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 before 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)

**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'], 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

**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`) – 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.swap`
- `SequenceEditor.active_strip`
- `SequenceEditor.meta_stack`
- `SequenceEditor.sequences`
- `SequenceEditor.sequences_all`

### 1.3.427 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

- `EffectSequence.color_balance`

- `ImageSequence.color_balance`
- `MetaSequence.color_balance`
- `MovieSequence.color_balance`
- `MulticamSequence.color_balance`
- `SceneSequence.color_balance`

### 1.3.428 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

- `EffectSequence.crop`
- `ImageSequence.crop`
- `MetaSequence.crop`
- `MovieSequence.crop`
- `MulticamSequence.crop`
- `SceneSequence.crop`

### 1.3.429 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** Collection of `Sequence`, (readonly)

**overlay\_frame**

Sequencers active strip

**Type** int in [-inf, inf], default 0

**overlay\_lock**

**Type** boolean, default False

**sequences**

**Type** Collection of `Sequence`, (readonly)

**sequences\_all**

**Type** Collection of `Sequence`, (readonly)

**show\_overlay**

Partial overlay ontop 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`

### 1.3.430 SequenceElement(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.SequenceElement` (*bpy\_struct*)  
Sequence strip data for a single frame

**filename**

**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

- `ImageSequence.elements`
- `Sequence.getStripElem`

### 1.3.431 SequenceProxy(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.SequenceProxy` (*bpy\_struct*)

Proxy parameters for a sequence strip

**directory**

Location to store the proxy files

**Type** string, default ""

**filepath**

Location of custom proxy file

**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

- `EffectSequence.proxy`
- `ImageSequence.proxy`
- `MetaSequence.proxy`
- `MovieSequence.proxy`
- `MulticamSequence.proxy`

- `SceneSequence.proxy`

### 1.3.432 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

- `EffectSequence.transform`
- `ImageSequence.transform`
- `MetaSequence.transform`
- `MovieSequence.transform`
- `MulticamSequence.transform`
- `SceneSequence.transform`

### 1.3.433 ShaderNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `ShaderNodeHueSaturation`, `ShaderNodeVectorMath`, `ShaderNodeRGB`, `ShaderNodeCameraData`, `ShaderNodeSeparateRGB`, `ShaderNodeMath`, `ShaderNodeRGBToBW`, `ShaderNodeExtendedMaterial`, `ShaderNodeRGBCurve`, `ShaderNodeInvert`, `ShaderNodeMaterial`, `ShaderNodeValue`, `ShaderNodeMixRGB`, `ShaderNodeVectorCurve`, `ShaderNodeCombineRGB`, `ShaderNodeOutput`, `ShaderNodeValToRGB`, `ShaderNodeGeometry`, `ShaderNodeTexture`, `ShaderNodeMapping`, `ShaderNodeSqueeze`, `ShaderNodeNormal`

**class** `bpy.types.ShaderNode` (*Node*)  
Material shader node

**type**

**Type** enum in ['OUTPUT', 'MATERIAL', 'RGB', 'VALUE', 'MIX\_RGB', 'VAL-TORGB', 'RGBTOBW', 'TEXTURE', 'NORMAL', 'GEOMETRY', 'MAPPING', 'CURVE\_VEC', 'CURVE\_RGB', 'CAMERA', 'MATH', 'VECT\_MATH', 'SQUEEZE', 'MATERIAL\_EXT', 'INVERT', 'SEPRGB', 'COMBRGB', 'HUE\_SAT', 'SCRIPT', 'GROUP'], default 'OUTPUT', (readonly)

### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.434 ShaderNodeCameraData(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

`class bpy.types.ShaderNodeCameraData` (*ShaderNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.435 ShaderNodeCombineRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

`class bpy.types.ShaderNodeCombineRGB` (*ShaderNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.436 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.location`
- `Node.outputs`
- `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`

### 1.3.437 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.location`
- `Node.outputs`
- `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`

### 1.3.438 ShaderNodeHueSaturation(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeHueSaturation` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.439 ShaderNodeInvert(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeInvert` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`

- `Node.outputs`
- `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`

### 1.3.440 ShaderNodeMapping(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeMapping` (*ShaderNode*)

**location**

Location offset for the input coordinate

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**max**

Maximum value to clamp coordinate to

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**min**

Minimum value to clamp coordinate to

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**rotation**

Rotation offset for the input coordinate

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**scale**

Scale adjustment for the input coordinate

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**use\_max**

Clamp the output coordinate to a maximum value

**Type** boolean, default False

**use\_min**

Clamp the output coordinate to a minimum value

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.441 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.location`
- `Node.outputs`
- `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`

### 1.3.442 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.location`
- `Node.outputs`
- `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`

### 1.3.443 ShaderNodeMixRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeMixRGB` (*ShaderNode*)

#### **blend\_type**

**Type** enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'DODGE', 'BURN', 'COLOR', 'VALUE', 'SATURATION', 'HUE', '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.location`
- `Node.outputs`
- `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`

### 1.3.444 ShaderNodeNormal(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeNormal` (*ShaderNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.445 ShaderNodeOutput(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeOutput` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.446 ShaderNodeRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeRGB` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.447 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.location`
- `Node.outputs`
- `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`

### 1.3.448 ShaderNodeRGBToBW(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeRGBToBW` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.449 ShaderNodeSeparateRGB(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeSeparateRGB` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`

- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.450 ShaderNodeSqueeze(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

**class** `bpy.types.ShaderNodeSqueeze` (*ShaderNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.451 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.location`
- `Node.outputs`
- `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`

### 1.3.452 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.location`
- `Node.outputs`
- `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`

### 1.3.453 ShaderNodeValue(ShaderNode)

base classes — `bpy_struct`, `Node`, `ShaderNode`

class `bpy.types.ShaderNodeValue` (*ShaderNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`

- `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`

### 1.3.454 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.location`
- `Node.outputs`
- `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`

### 1.3.455 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.location`
- `Node.outputs`
- `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`

### 1.3.456 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 int in [0, 300000], default 0

    frame_property
        Assign the action's current frame number to this property
        Type string, default ""

    frame_start
        Type int in [0, 300000], default 0

    mode
        Action playback type
        Type enum in ['PLAY', '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`

### 1.3.457 ShapeKey(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ShapeKey` (*bpy\_struct*)  
Shape key in a shape keys datablock

**data**

**Type** 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**

**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.keys`
- `Key.reference_key`
- `Object.active_shape_key`
- `Object.add_shape_key`
- `ShapeKey.relative_key`

### 1.3.458 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`

### 1.3.459 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`

### 1.3.460 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`

### 1.3.461 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

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

### Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`

- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.462 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`

**offset**

Distance to keep from the target

**Type** float in [0, 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\_cull\_back\_faces**

Stop vertices from projecting to a back face on the target

**Type** boolean, default False

**use\_cull\_front\_faces**

Stop vertices from projecting to a front face on the target

**Type** boolean, default False

**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**

**Type** enum in ['NEAREST\_SURFACEPOINT', 'PROJECT', 'NEAREST\_VERTEX'], default 'NEAREST\_SURFACEPOINT'

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`



### 1.3.463 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**

**Type** enum in ['TWIST', 'BEND', 'TAPER', 'STRETCH'], default 'TWIST'

**factor**

**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**

**Type** boolean, default False

**lock\_y**

**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.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`

### 1.3.464 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`

### 1.3.465 SmokeDomainSettings(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.SmokeDomainSettings` (*bpy\_struct*)

Smoke domain settings

**alpha**

Higher value results in sinking 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**

Higher value results in faster rising smoke

**Type** float in [-5, 5], default 0.0

**collision\_extents**

Selects which domain border will be treated as collision object.

**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\_compress\_high\_type**

Compression method to be used

**Type** enum in ['CACHELIGHT', 'CACHEHEAVY'], default 'CACHELIGHT'

**point\_cache\_compress\_type**

Compression method to be used

**Type** enum in ['CACHELIGHT', 'CACHEHEAVY'], default 'CACHELIGHT'

**point\_cache\_high**

Type `PointCache`, (readonly, never None)

**point\_cache\_low**

Type `PointCache`, (readonly, never None)

**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**

Smoothens emitted smoke to avoid blockiness.

Type `boolean`, default False

**strength**

Strength of wavelet 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`

### 1.3.466 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 it's 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 allows given density value in emitter area.

**Type** boolean, default False

**use\_outflow**

Deletes 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`

### 1.3.467 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**

**Type** enum in ['NONE', 'DOMAIN', 'FLOW', 'COLLISION'], default 'NONE'

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`

- `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`

### 1.3.468 SmoothModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

**class** `bpy.types.SmoothModifier` (*Modifier*)

Smoothing effect modifier

**factor**

**Type** float in [-inf, inf], default 0.0

**iterations**

**Type** int in [-32768, 32767], default 0

**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.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`

### 1.3.469 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.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`

### 1.3.470 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** float in [0, 30000], default 0.0

**aerodynamics\_type**

Method of calculating aerodynamic interaction

**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

**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** float in [0, 100], default 0.0

**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 [-inf, 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 [-inf, 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** float in [0, 200], default 0.0

**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**

Adds 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`

### 1.3.471 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

**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

**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

**use\_rim\_material**

Use in the next material for rim faces

**Type** boolean, default False

**vertex\_group**

Vertex group name

**Type** string, default ""

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.472 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

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.sounds`
- `SoundActuator.sound`

- `SoundSequence.sound`

### 1.3.473 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**

Sets the 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**

Sets the 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`

### 1.3.474 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

**attenuation**

Attenuation in dezibel

**Type** float in [-100, 40], default 0.0

**filepath**

**Type** string, default ""

**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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`
- `Sequence.frame_still_end`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`

- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.475 Space(`bpy_struct`)

base class — `bpy_struct`

subclasses — `SpaceUserPreferences`, `SpaceOutliner`, `SpaceImageEditor`, `SpaceSequenceEditor`, `SpaceProperties`, `SpaceGraphEditor`, `SpaceLogicEditor`, `SpaceInfo`, `SpaceConsole`, `SpaceView3D`, `SpaceDopeSheetEditor`, `SpaceTextEditor`, `SpaceFileBrowser`, `SpaceNodeEditor`, `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', 'AUDIO\_WINDOW', 'DOPESHEET\_EDITOR', 'NLA\_EDITOR', 'SCRIPTS\_WINDOW', 'TIMELINE', 'NODE\_EDITOR', 'LOGIC\_EDITOR', 'CONSOLE', 'USER\_PREFERENCES'], 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.active_space`
- `Area.spaces`
- `Context.space_data`

### 1.3.476 SpaceConsole(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceConsole` (*Space*)

Interactive python console

**console\_type**

Console type

**Type** enum in ['PYTHON', 'REPORT'], default 'PYTHON'

**font\_size**

Font size to use for displaying the text

**Type** int in [8, 32], default 0

**history**

Command history

**Type** Collection of `ConsoleLine`, (readonly)

**language**

Command line prompt language

**Type** string, default ""

**prompt**

Command line prompt

**Type** string, default ""

**scrollback**

Command output

**Type** Collection of `ConsoleLine`, (readonly)

**select\_end**

**Type** int in [0, inf], default 0

**select\_start**

**Type** int in [0, inf], default 0

**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`

### 1.3.477 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

**Type** enum in ['NONE', 'STEP', 'FRAME', 'MARKER'], default 'NONE'

**dopesheet**

Settings for filtering animation data

**Type** `DopeSheet`, (readonly)

**mode**

Editing context being displayed

**Type** enum in ['DOPE SHEET', 'ACTION', 'SHAPEKEY'], default 'ACTION'

**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\_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`

### 1.3.478 SpaceFileBrowser(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceFileBrowser` (*Space*)

File browser space data

**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`

### 1.3.479 SpaceGraphEditor(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceGraphEditor` (*Space*)

Graph Editor space data

**auto\_snap**

Automatic time snapping settings for transformations

**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

**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\_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`

### 1.3.480 SpacelImageEditor(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceImageEditor` (*Space*)

Image and UV editor space data

**curves**

Color curve mapping to use for displaying the image

**Type** `CurveMapping`, (readonly)

**draw\_channels**

Channels of the image to draw

**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)

## 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`

### 1.3.481 SpaceInfo(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceInfo` (*Space*)  
Info space data

## 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`

### 1.3.482 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`

### 1.3.483 SpaceNLA(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceNLA` (*Space*)  
NLA editor space data

**auto\_snap**

Automatic time snapping settings for transformations

**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 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`

### 1.3.484 SpaceNodeEditor(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceNodeEditor` (*Space*)

Node editor space data

**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`, (readonly)

**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

**Type** enum in ['OBJECT', 'WORLD', 'BRUSH'], default 'OBJECT'

#### **tree\_type**

Node tree type to display and edit

**Type** enum in ['MATERIAL', 'TEXTURE', 'COMPOSITING'], default 'MATERIAL'

## 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`

### 1.3.485 SpaceOutliner(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceOutliner` (*Space*)

Outliner space data

#### **display\_mode**

Type of information to display

**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`

### 1.3.486 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



**Type** enum in ['SCENE', 'RENDER', 'WORLD', 'OBJECT', 'CONSTRAINT', 'MODIFIER', 'DATA', 'BONE', 'BONE\_CONSTRAINT', 'MATERIAL', 'TEXTURE', 'PARTICLE', 'PHYSICS'], default 'RENDER'

**pin\_id**

**Type** ID

**show\_brush\_texture**

Show brush textures

**Type** boolean, default False

**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`

### 1.3.487 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**

The 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**

Offsets image horizontally from the view center

**Type** float in [-inf, inf], default 0.0

**offset\_y**

Offsets image horizontally 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', '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**

The 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`

### 1.3.488 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**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\_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\_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`

### 1.3.489 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\_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 channels only

**Type** boolean, default False

**use\_play\_3d\_editors**

**Type** boolean, default False

**use\_play\_animation\_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`
- `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`

### 1.3.490 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

**Type** enum in `['ANGLE', 'AREA']`, default `'ANGLE'`

**edge\_draw\_type**

Draw type for drawing UV 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\_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

**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`

### 1.3.491 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`

### 1.3.492 SpaceView3D(Space)

base classes — `bpy_struct`, `Space`

**class** `bpy.types.SpaceView3D` (*Space*)

3D View space data

**background\_images**

List of background images

**Type** Collection of `BackgroundImage`, (readonly)

**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, 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**

The number of grid lines to display in perspective view

**Type** int in [0, 1024], default 0

**grid\_spacing**

The distance between 3D View grid lines

**Type** float in [0, inf], default 0.0

**grid\_subdivisions**

The 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\_and\_layers**

Use the scene's active camera and layers in this view, rather than local layers

**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

**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\_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\_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

**transform\_orientation**

Transformation 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 object centers only

**Type** boolean, default False

**viewport\_shade**

Method to display/shade objects in the 3D View

**Type** enum in ['BOUNDBOX', 'WIREFRAME', 'SOLID', 'TEXTURED'], 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`

### 1.3.493 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.effect\_fader
- Sequence.frame\_final\_end
- Sequence.frame\_offset\_end
- Sequence.frame\_still\_end
- 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
- 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`

### 1.3.494 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` 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` 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, inf], default 0

**resolution\_v**

Surface subdivisions per segment

**Type** int in [1, inf], 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`

### 1.3.495 SplineBezierPoints(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.SplineBezierPoints` (*bpy\_struct*)

Collection of spline bezier points

**add** (*number=1*)

Add a number of points to this spline.

**Parameters**

- **number** (*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`

### 1.3.496 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

**Type** enum in ['NONE', 'BONE\_ORIGINAL', 'VOLUME\_PRESERVE'], default 'NONE'

## Inherited Properties

- `bpy_struct.id_data`
- `Constraint.name`
- `Constraint.active`
- `Constraint.mute`
- `Constraint.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.497 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 `[-inf, inf]`, default `0.0`, (readonly)

**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`

### 1.3.498 SplinePoints(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.SplinePoints` (*bpy\_struct*)  
Collection of spline points

**add** (*number=1*)  
Add a number of points to this spline.

#### Parameters

- **number** (*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.points`

### 1.3.499 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 (Buffer Shadows)

**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

**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)

**Type** enum in ['BOX', 'TENT', 'GAUSS'], default 'BOX'

**shadow\_method**

Method to compute lamp shadow with

**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

**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 (Buffer Shadows)

**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.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.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.500 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`

### 1.3.501 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

**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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.502 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.srna`
- `Property.description`
- `Property.identifier`
- `Property.is_never_none`
- `Property.is_readonly`
- `Property.is_runtime`
- `Property.is_registered`
- `Property.is_registered_optional`
- `Property.is_required`
- `Property.is_output`
- `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`

### 1.3.503 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** 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** 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`

### 1.3.504 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

**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**

**Type** enum in ['SOFT\_NOISE', 'HARD\_NOISE'], default 'SOFT\_NOISE'

**stucci\_type**

**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.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`

### 1.3.505 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.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`

### 1.3.506 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

**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.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.use_specular`
- `Lamp.texture_slots`
- `Lamp.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.507 SurfaceCurve(Curve)

base classes — `bpy_struct`, `ID`, `Curve`

**class** `bpy.types.SurfaceCurve` (*Curve*)  
Curve datablock used for storing surfaces

**use\_map\_on\_length**

Generate texture mapping coordinates following the curve direction, rather than the local bounding box

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Curve.animation_data`
- `Curve.use_auto_texspace`
- `Curve.use_fill_back`
- `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.use_fill_deform`
- `Curve.use_path_follow`
- `Curve.use_fill_front`
- `Curve.use_map_on_length`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.508 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.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`

### 1.3.509 TexMapping(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.TexMapping` (*bpy\_struct*)

Mapping settings

#### **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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.510 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** Collection of `TextLine`, (readonly)

**markers**

Text markers highlighting part of the text

**Type** 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.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`

## References

- `BlendData.texts`
- `Filter2DActuator.gls_l_shader`
- `MainTexts.load`
- `MainTexts.new`
- `MainTexts.remove`
- `PythonConstraint.text`
- `PythonController.text`
- `SceneGameData.dome_text`
- `SpaceTextEditor.text`

### 1.3.511 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`

### 1.3.512 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`

### 1.3.513 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

**Type** enum in ['LEFT', 'CENTRAL', 'RIGHT', 'JUSTIFY', 'FLUSH'], default 'LEFT'

**body**

contents of this text object

**Type** string, default ""

**body\_format**

Stores the style of each character

**Type** 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. familya, familyb etc, and turn on Verts Duplication

**Type** string, default ""

**follow\_curve**

Curve deforming text object

**Type** `Object`

**font**

**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** 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\_map\_on\_length**

Generate texture mapping coordinates following the curve direction, rather than the local bounding box

**Type** boolean, default False

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `ID.library`
- `ID.tag`
- `ID.users`
- `Curve.animation_data`
- `Curve.use_auto_texspace`
- `Curve.use_fill_back`
- `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.use_fill_deform`
- `Curve.use_path_follow`
- `Curve.use_fill_front`
- `Curve.use_map_on_length`
- `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`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_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`

### 1.3.514 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`

### 1.3.515 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 [-inf, inf], 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`

### 1.3.516 Texture(ID)

base classes — `bpy_struct`, `ID`

subclasses — `ImageTexture`, `MarbleTexture`, `EnvironmentMapTexture`, `PointDensityTexture`, `VoxelDataTexture`, `BlendTexture`, `MusgraveTexture`, `StucciTexture`, `VoronoiTexture`, `MagicTexture`, `NoiseTexture`, `PluginTexture`, `WoodTexture`, `CloudsTexture`, `DistortedNoiseTexture`

**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**

**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**

**Type** float in [0, 2], default 0.0

**node\_tree**

Node tree for node-based textures

**Type** `NodeTree`, (readonly)

**saturation**

**Type** float in [0, 2], default 0.0

**type**

**Type** enum in ['NONE', 'BLEND', 'CLOUDS', 'DISTORTED\_NOISE', 'ENVIRONMENT\_MAP', 'IMAGE', 'MAGIC', 'MARBLE', 'MUSGRAVE', 'NOISE', 'POINT\_DENSITY', 'STUCCI', 'VORONOI', 'VOXEL\_DATA', 'WOOD'], 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)

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.textures`
- `Brush.texture`
- `CompositorNodeTexture.texture`
- `DisplaceModifier.texture`
- `FieldSettings.texture`
- `Lamp.active_texture`
- `MainTextures.new`
- `MainTextures.remove`
- `Material.active_texture`
- `ShaderNodeTexture.texture`
- `TextureNodeTexture.texture`
- `TextureSlot.texture`
- `WaveModifier.texture`
- `World.active_texture`

### 1.3.517 TextureNode(Node)

base classes — `bpy_struct`, `Node`

subclasses — `TextureNodeScale`, `TextureNodeRGBToBW`, `TextureNodeTranslate`,  
`TextureNodeTexture`, `TextureNodeCompose`, `TextureNodeValToNor`,  
`TextureNodeHueSaturation`, `TextureNodeImage`, `TextureNodeBricks`,  
`TextureNodeCurveTime`, `TextureNodeInvert`, `TextureNodeCurveRGB`, `TextureNodeDistance`,  
`TextureNodeDecompose`, `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.location
- Node.outputs

## Inherited Functions

- bpy\_struct.as\_pointer
- bpy\_struct.callback\_add
- bpy\_struct.callback\_remove
- bpy\_struct.driver\_add
- bpy\_struct.driver\_remove
- bpy\_struct.get
- bpy\_struct.is\_property\_hidden
- bpy\_struct.is\_property\_set
- bpy\_struct.items
- bpy\_struct.keyframe\_delete
- bpy\_struct.keyframe\_insert
- bpy\_struct.keys
- bpy\_struct.path\_from\_id
- bpy\_struct.path\_resolve
- bpy\_struct.type\_recast
- bpy\_struct.values

### 1.3.518 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.location`
- `Node.outputs`
- `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`

### 1.3.519 TextureNodeChecker(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeChecker` (*TextureNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`

- `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`

### 1.3.520 TextureNodeCompose(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeCompose` (*TextureNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.521 TextureNodeCoordinates(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeCoordinates` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.522 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.location`
- `Node.outputs`
- `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`

### 1.3.523 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.location`
- `Node.outputs`

- `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`

### 1.3.524 TextureNodeDecompose(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeDecompose` (*TextureNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.525 TextureNodeDistance(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeDistance` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.526 TextureNodeHueSaturation(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeHueSaturation` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`

- `Node.location`
- `Node.outputs`
- `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`

### 1.3.527 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.location`
- `Node.outputs`
- `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`

### 1.3.528 TextureNodeInvert(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeInvert` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.529 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.location`
- `Node.outputs`
- `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`

**1.3.530 TextureNodeMixRGB(TextureNode)**

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeMixRGB` (*TextureNode*)

**blend\_type**

**Type** enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIVIDE', 'DIFFERENCE', 'DARKEN', 'LIGHTEN', 'DODGE', 'BURN', 'COLOR', 'VALUE', 'SATURATION', 'HUE', '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.location`
- `Node.outputs`
- `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`

### 1.3.531 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.location`
- `Node.outputs`
- `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`

### 1.3.532 TextureNodeRGBToBW(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeRGBToBW` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.533 TextureNodeRotate(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeRotate` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.534 TextureNodeScale(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeScale` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.535 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.location`
- `Node.outputs`
- `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`

### 1.3.536 TextureNodeTranslate(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeTranslate` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.537 TextureNodeValToNor(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeValToNor` (*TextureNode*)

## Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`

### 1.3.538 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.location`
- `Node.outputs`
- `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`

### 1.3.539 TextureNodeViewer(TextureNode)

base classes — `bpy_struct`, `Node`, `TextureNode`

**class** `bpy.types.TextureNodeViewer` (*TextureNode*)

#### Inherited Properties

- `bpy_struct.id_data`
- `Node.name`
- `Node.inputs`
- `Node.location`
- `Node.outputs`
- `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`



### 1.3.540 TextureSlot(bpy\_struct)

base class — `bpy_struct`

subclasses — `MaterialTextureSlot`, `LampTextureSlot`, `BrushTextureSlot`, `WorldTextureSlot`

**class** `bpy.types.TextureSlot` (*bpy\_struct*)

Texture slot defining the mapping and influence of a texture

**blend\_type**

**Type** enum in ['MIX', 'ADD', 'SUBTRACT', 'MULTIPLY', 'SCREEN', 'OVERLAY', 'DIFFERENCE', 'DIVIDE', 'DARKEN', 'LIGHTEN', 'HUE', 'SATURATION', 'VALUE', 'COLOR', 'SOFT LIGHT', 'LINEAR LIGHT'], default 'MIX'

**color**

The default color for textures that don't return RGB

**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**

Inverts the values of the texture to reverse its effect

**Type** boolean, default False

**name**

Texture slot name

**Type** string, default "", (readonly)

**offset**

Fine tunes 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**

Sets 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**

Converts 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`

### 1.3.541 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** Collection of `ThemeBoneColorSet`, (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', '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'], 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`

### 1.3.542 ThemeAudioWindow(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ThemeAudioWindow` (*bpy\_struct*)

Theme settings for the Audio Window

**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)

**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`

### 1.3.543 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`

### 1.3.544 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`

### 1.3.545 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`

### 1.3.546 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`

### 1.3.547 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

**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.group_label`
- `ThemeStyle.panel_title`
- `ThemeStyle.widget`
- `ThemeStyle.widget_label`

### 1.3.548 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\_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)

**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`

### 1.3.549 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`

### 1.3.55 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`

### 1.3.551 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`

### 1.3.552 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`

### 1.3.553 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)

**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`

### 1.3.554 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`

### 1.3.555 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`

### 1.3.556 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`

### 1.3.557 ThemeStyle(bpy\_struct)

base class — `bpy_struct`**class** `bpy.types.ThemeStyle` (*bpy\_struct*)

Theme settings for style sets

**group\_label**

**Type** `ThemeFontStyle`, (readonly, never None)

**panel\_title**

**Type** `ThemeFontStyle`, (readonly, never None)

**panelzoom**

Default zoom level for panel areas

**Type** float in [0.5, 2], default 0.0

**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`

### 1.3.558 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`

### 1.3.559 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`

### 1.3.560 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`

### 1.3.561 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`

### 1.3.562 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)

**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)

**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)

**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)

**panel**

**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)

**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`

### 1.3.563 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`

### 1.3.564 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`

### 1.3.565 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.new`
- `ActionPoseMarkers.remove`
- `Scene.timeline_markers`
- `TimelineMarkers.new`
- `TimelineMarkers.remove`

### 1.3.566 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`

### 1.3.567 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\_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

**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**

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**Type** string, default ""

#### **etch\_roll\_mode**

Method used to adjust the roll of bones when retargeting

**Type** enum in ['NONE', 'VIEW', 'JOINT'], default 'NONE'

#### **etch\_side**

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**Type** string, default ""

**etch\_subdivision\_number**

Number of bones in the subdivided stroke

**Type** int in [1, 10000], 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

**Type** enum in ['DISABLED', 'ENABLED', 'CONNECTED'], default 'DISABLED'

**proportional\_edit\_falloff**

Falloff type for proportional editing mode

**Type** enum in ['SMOOTH', 'SPHERE', 'ROOT', 'SHARP', 'LINEAR', 'CONSTANT', 'RANDOM'], default 'SMOOTH'

**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

**Type** enum in ['INCREMENT', 'VERTEX', 'EDGE', 'FACE', 'VOLUME'], default 'INCREMENT'

**snap\_target**

Which part to snap onto the 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**

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**Type** boolean, default False

**use\_etch\_autoname**

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**Type** boolean, default False

**use\_etch\_overdraw**

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**Type** boolean, default False

**use\_etch\_quick**

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**Type** boolean, default False

**use\_keyframe\_insert\_auto**

Automatic keyframe insertion for Objects and Bones

**Type** boolean, default False

**use\_mesh\_automerge**

Automatically merge vertices moved to the same location

**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 vertices on the surface of other objects

**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

**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`

### 1.3.568 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

**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`

### 1.3.569 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.is_valid`
- `Constraint.show_expanded`
- `Constraint.influence`
- `Constraint.error_location`
- `Constraint.owner_space`
- `Constraint.is_proxy_local`
- `Constraint.error_rotation`
- `Constraint.target_space`
- `Constraint.type`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`

- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.570 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.is\_valid
- Constraint.show\_expanded
- Constraint.influence
- Constraint.error\_location
- Constraint.owner\_space
- Constraint.is\_proxy\_local
- Constraint.error\_rotation
- Constraint.target\_space
- Constraint.type

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `bpy_struct.keyframe_insert`
- `bpy_struct.keys`
- `bpy_struct.path_from_id`
- `bpy_struct.path_resolve`
- `bpy_struct.type_recast`
- `bpy_struct.values`

### 1.3.571 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`

### 1.3.572 TransformSequence(EffectSequence)

base classes — `bpy_struct`, `Sequence`, `EffectSequence`

**class** `bpy.types.TransformSequence` (*EffectSequence*)  
Sequence strip applying affine transformations to other strips

**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.effect_fader`
- `Sequence.frame_final_end`
- `Sequence.frame_offset_end`

- `Sequence.frame_still_end`
- `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`
- `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`

### 1.3.573 `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`

**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='BLENDER', 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 ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'BLANK038', 'FULLSCREEN\_ENTER', 'FULLSCREEN\_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE\_SHADED', 'BLANK042', 'BLANK043', 'BLANK044', 'BLANK045', 'BLANK046', 'BLANK047', 'BLANK048', 'BLANK049', 'BLANK050', 'BLANK051', 'BLANK052', 'BLANK052b', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE\_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA',*

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- **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='BLENDER'*)  
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 ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'BLANK038', 'FULLSCREEN\_ENTER', 'FULLSCREEN\_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE\_SHADED', 'BLANK042', 'BLANK043', 'BLANK044', 'BLANK045', 'BLANK046', 'BLANK047', 'BLANK048', 'BLANK049', 'BLANK050', 'BLANK051', 'BLANK052', 'BLANK052b', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE\_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'ASSET\_MANAGER', 'BLANK057', 'BLANK058', 'BLANK059', 'BLANK060', 'BLANK061', 'BLANK061b', 'OBJECT\_DATAMODE', 'EDITMODE\_HLT', 'FACESEL\_HLT', 'VPAINT\_HLT', 'TPAINT\_HLT', 'WPAINT\_HLT', 'SCULPTMODE\_HLT', 'POSE\_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'BLANK063', 'BLANK064', 'BLANK065', 'BLANK066', 'BLANK067', 'BLANK068', 'BLANK069', 'BLANK070', 'BLANK071', 'BLANK072', 'BLANK073', 'BLANK074', 'BLANK075', 'BLANK076', 'BLANK077', 'BLANK077b', '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', 'BLANK079', 'PACKAGE', 'UGLY\_PACKAGE', 'BLANK079b', 'BRUSH\_DATA', 'IMAGE\_DATA', 'FILE', 'FCURVE', 'FONT\_DATA', 'RENDER\_RESULT', 'SURFACE\_DATA', 'EMPTY\_DATA', 'SETTINGS', 'RENDER\_ANIMATION', 'RENDER\_STILL', 'BLANK080F', 'BOIDS', 'STRANDS', 'LIBRARY\_DATA\_INDIRECT', 'GREASEPENCIL', 'BLANK083', 'BLANK084', 'GROUP\_BONE', 'GROUP\_VERTEX', 'GROUP\_VCOL', 'GROUP\_UVS', 'BLANK089', 'BLANK090', 'RNA', 'RNA\_ADD', 'BLANK092', 'BLANK093', 'BLANK094', 'BLANK095', 'BLANK096', 'BLANK097', 'BLANK098', 'BLANK099', 'BLANK100', 'BLANK101', 'BLANK102', 'BLANK103', 'BLANK104',*

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**prop\_enum** (*data, property, value, text=*”“, *icon=*'BLENDER')

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* ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'BLANK038', 'FULLSCREEN\_ENTER', 'FULLSCREEN\_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE\_SHADED', 'BLANK042', 'BLANK043', 'BLANK044', 'BLANK045', 'BLANK046', 'BLANK047', 'BLANK048', 'BLANK049', 'BLANK050', 'BLANK051', 'BLANK052', 'BLANK052b', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE\_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'ASSET\_MANAGER', 'BLANK057', 'BLANK058', 'BLANK059', 'BLANK060', 'BLANK061', 'BLANK061b', 'OBJECT\_DATAMODE', 'EDITMODE\_HLT', 'FACESEL\_HLT', 'VPAINT\_HLT', 'TPAINT\_HLT', 'WPAINT\_HLT', 'SCULPTMODE\_HLT', 'POSE\_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'BLANK063', 'BLANK064', 'BLANK065', 'BLANK066', 'BLANK067', 'BLANK068', 'BLANK069', 'BLANK070', 'BLANK071', 'BLANK072', 'BLANK073', 'BLANK074', 'BLANK075',



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BYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY', 'SHORTDISPLAY', 'GHOST',  
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'FILTER', 'NEWFOLDER', 'BLANK285F', 'FILE\_PARENT', 'FILE\_REFRESH', 'FILE\_FOLDER', 'FILE\_BLANK', 'FILE\_BLEND', 'FILE\_IMAGE', 'FILE\_MOVIE', 'FILE\_SCRIPT', 'FILE\_SOUND', 'FILE\_FONT', 'BLANK291b', 'BLANK292', 'BLANK293', 'BLANK294', 'BLANK295', 'BLANK296', 'BLANK297', 'BLANK298', 'BLANK299', 'BLANK300', 'BLANK301', 'BLANK302', 'BLANK303', 'BLANK304', 'BLANK305', 'BLANK306', 'BACK', 'FORWARD', 'BLANK309', 'BLANK310', 'BLANK311', 'BLANK312', 'BLANK313', 'BLANK314', 'BLANK315', 'BLANK316', 'DISK\_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR', 'ALIASED', 'ANTIALIASED', 'MAT\_SPHERE\_SKY', 'BLANK319', 'BLANK320', 'BLANK321', 'BLANK322', 'WORDWRAP\_OFF', 'WORDWRAP\_ON', 'SYNTAX\_OFF', 'SYNTAX\_ON', 'LINENUMBERS\_OFF', 'LINENUMBERS\_ON', 'SCRIPTPLUGINS', 'BLANK323', 'BLANK324', 'BLANK325', 'BLANK326', 'BLANK327', 'BLANK328', 'BLANK328b', 'SEQ\_SEQUENCER', 'SEQ\_PREVIEW', 'SEQ\_LUMA\_WAVEFORM', 'SEQ\_CHROMA\_SCOPE', 'SEQ\_HISTOGRAM', 'SEQ\_SPLITVIEW', 'BLANK331', 'BLANK332', 'BLANK333', 'IMAGE\_RGB', 'IMAGE\_RGB\_ALPHA', 'IMAGE\_ALPHA', 'IMAGE\_ZDEPTH', 'IMAGE\_FILE', 'BLANK336', 'BLANK337', 'BLANK338', 'BLANK339', 'BLANK340', 'BLANK341', 'BLANK342', 'BLANK343', 'BLANK344', 'BLANK345', 'BLANK346', 'BLANK346b', '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

**prop\_search** (*data*, *property*, *search\_data*, *search\_property*, *text*=" ", *icon*='BLENDER')

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 ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'STY-

LUS\_PRESSURE', 'GHOST\_DISABLED', 'NEW', 'FILE\_TICK', 'QUIT', 'URL',  
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FACE\_NTORUS', 'BLANK636', 'BLANK637', 'BLANK638', 'CURVE\_BEZCURVE',

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 'FF', 'REW', 'PAUSE', 'PREV\_KEYFRAME', 'NEXT\_KEYFRAME', 'PLAY\_AUDIO',  
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**operator** (*operator*, *text*=" ", *icon*='BLENDER', *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 ['BLENDER', 'QUESTION', 'ERROR', 'CANCEL', 'TRIA\_RIGHT', 'TRIA\_DOWN', 'TRIA\_LEFT', 'TRIA\_UP', 'ARROW\_LEFTRIGHT', 'PLUS', 'DIS-

CLOSURE\_TRI\_DOWN', 'DISCLOSURE\_TRI\_RIGHT', 'RADIOBUT\_OFF', 'RADIOBUT\_ON', 'MENU\_PANEL', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'BLANK038', 'FULLSCREEN\_ENTER', 'FULLSCREEN\_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE\_SHADED', 'BLANK042', 'BLANK043', 'BLANK044', 'BLANK045', 'BLANK046', 'BLANK047', 'BLANK048', 'BLANK049', 'BLANK050', 'BLANK051', 'BLANK052', 'BLANK052b', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE\_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'ASSET\_MANAGER', 'BLANK057', 'BLANK058', 'BLANK059', 'BLANK060', 'BLANK061', 'BLANK061b', 'OBJECT\_DATAMODE', 'EDITMODE\_HLT', 'FACESEL\_HLT', 'VPAINT\_HLT', 'TPAINT\_HLT', 'WPAINT\_HLT', 'SCULPTMODE\_HLT', 'POSE\_HLT', 'PARTICLEMODE', 'LIGHTPAINT', 'BLANK063', 'BLANK064', 'BLANK065', 'BLANK066', 'BLANK067', 'BLANK068', 'BLANK069', 'BLANK070', 'BLANK071', 'BLANK072', 'BLANK073', 'BLANK074', 'BLANK075', 'BLANK076', 'BLANK077', 'BLANK077b', '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', 'BLANK079', 'PACKAGE', 'UGLYPACKAGE', 'BLANK079b', 'BRUSH\_DATA', 'IMAGE\_DATA', 'FILE', 'FCURVE', 'FONT\_DATA', 'RENDER\_RESULT', 'SURFACE\_DATA', 'EMPTY\_DATA', 'SETTINGS', 'RENDER\_ANIMATION', 'RENDER\_STILL', 'BLANK080F', 'BOIDS', 'STRANDS', 'LIBRARY\_DATA\_INDIRECT', 'GREASEPENCIL', 'BLANK083', 'BLANK084', 'GROUP\_BONE', 'GROUP\_VERTEX', 'GROUP\_VCOL', 'GROUP\_UVS', 'BLANK089', 'BLANK090', 'RNA', 'RNA\_ADD', 'BLANK092', 'BLANK093', 'BLANK094', 'BLANK095', 'BLANK096', 'BLANK097', 'BLANK098', 'BLANK099', 'BLANK100', 'BLANK101', 'BLANK102', 'BLANK103', 'BLANK104', 'BLANK105', 'BLANK106', 'BLANK107', 'BLANK108', 'BLANK109', 'BLANK110', 'BLANK111', 'BLANK112', 'BLANK113', 'BLANK114', 'BLANK115', 'BLANK116', 'BLANK116b', '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', 'BLANK119', 'BLANK120', 'BLANK121', 'BLANK122', 'BLANK123', 'BLANK124', 'BLANK125', 'BLANK126', 'BLANK127', 'RESTRICT\_VIEW\_OFF', 'RESTRICT\_VIEW\_ON', 'RESTRICT\_SELECT\_OFF', 'RESTRICT\_SELECT\_ON', 'RESTRICT\_RENDER\_OFF', 'RESTRICT\_RENDER\_ON', 'BLANK127b', '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\_POSE',

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 CLOSURE\_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\_enums** (*operator*, *property*)

`operator_enums`

#### Parameters

- **operator** (*string*) – Identifier of the operator.
- **property** (*string*) – Identifier of property in operator.

**operator\_menu\_enum** (*operator*, *property*, *text*=" ", *icon*='BLENDER')

`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 [`'BLENDER'`, `'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'`, `'PYTHON'`, `'BLANK003'`, `'DOT'`, `'BLANK004'`, `'X'`, `'BLANK005'`, `'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'`, `'BLANK038'`, `'FULLSCREEN_ENTER'`, `'FULLSCREEN_EXIT'`, `'BLANK1'`, `'LAMP'`, `'MATERIAL'`, `'TEXTURE'`, `'ANIM'`, `'WORLD'`, `'SCENE'`, `'EDIT'`, `'GAME'`, `'RADIO'`, `'SCRIPT'`, `'PARTICLES'`, `'PHYSICS'`, `'SPEAKER'`, `'TEXTURE_SHADED'`, `'BLANK042'`, `'BLANK043'`, `'BLANK044'`, `'BLANK045'`, `'BLANK046'`, `'BLANK047'`, `'BLANK048'`, `'BLANK049'`, `'BLANK050'`, `'BLANK051'`, `'BLANK052'`, `'BLANK052b'`, `'VIEW3D'`, `'IPO'`, `'OOPS'`, `'BUTS'`, `'FILESEL'`, `'IMAGE_COL'`, `'INFO'`, `'SEQUENCE'`, `'TEXT'`, `'IMASEL'`, `'SOUND'`, `'ACTION'`, `'NLA'`, `'SCRIPTWIN'`, `'TIME'`, `'NODETREE'`, `'LOGIC'`, `'CONSOLE'`, `'PREFERENCES'`, `'ASSET_MANAGER'`, `'BLANK057'`, `'BLANK058'`, `'BLANK059'`, `'BLANK060'`, `'BLANK061'`, `'BLANK061b'`, `'OBJECT_DATAMODE'`, `'EDITMODE_HLT'`, `'FACESEL_HLT'`, `'VPAINT_HLT'`, `'TPAINT_HLT'`, `'WPAINT_HLT'`, `'SCULPTMODE_HLT'`, `'POSE_HLT'`, `'PARTICLEMODE'`, `'LIGHTPAINT'`, `'BLANK063'`, `'BLANK064'`, `'BLANK065'`, `'BLANK066'`, `'BLANK067'`, `'BLANK068'`, `'BLANK069'`, `'BLANK070'`, `'BLANK071'`, `'BLANK072'`, `'BLANK073'`, `'BLANK074'`, `'BLANK075'`, `'BLANK076'`, `'BLANK077'`, `'BLANK077b'`, `'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'`,

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**label** (*text*=" ", *icon*='BLENDER')

Item. Display text in the layout.

#### Parameters

- **text** (*string*, (optional)) – Override automatic text of the item.
- **icon** (*enum in* ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'BLANK038', 'FULLSCREEN\_ENTER', 'FULLSCREEN\_EXIT', 'BLANK1', 'LAMP', 'MATERIAL', 'TEXTURE', 'ANIM', 'WORLD', 'SCENE', 'EDIT', 'GAME', 'RADIO', 'SCRIPT', 'PARTICLES', 'PHYSICS', 'SPEAKER', 'TEXTURE\_SHADED', 'BLANK042', 'BLANK043', 'BLANK044', 'BLANK045', 'BLANK046', 'BLANK047', 'BLANK048', 'BLANK049', 'BLANK050', 'BLANK051', 'BLANK052', 'BLANK052b', 'VIEW3D', 'IPO', 'OOPS', 'BUTS', 'FILESEL', 'IMAGE\_COL', 'INFO', 'SEQUENCE', 'TEXT', 'IMASEL', 'SOUND', 'ACTION', 'NLA', 'SCRIPTWIN', 'TIME', 'NODETREE', 'LOGIC', 'CONSOLE', 'PREFERENCES', 'ASSET\_MANAGER', 'BLANK057', 'BLANK058', 'BLANK059', 'BLANK060',

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**menu** (*menu*, *text*=" ", *icon*='BLENDER')

menu

#### Parameters

- **menu** (*string*) – Identifier of the menu.
- **text** (*string*, (optional)) – Override automatic text of the item.
- **icon** (*enum* in ['BLENDER', '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', 'PYTHON', 'BLANK003', 'DOT', 'BLANK004', 'X', 'BLANK005', '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', 'REN-



*DER\_REGION*, *BORDER\_RECT*, *BORDER\_LASSO*, *FREEZE*, *STYLUS\_PRESSURE*, *GHOST\_DISABLED*, *NEW*, *FILE\_TICK*, *QUIT*, *URL*, *RECOVER\_LAST*, *BLANK038*, *FULLSCREEN\_ENTER*, *FULLSCREEN\_EXIT*, *BLANK1*, *LAMP*, *MATERIAL*, *TEXTURE*, *ANIM*, *WORLD*, *SCENE*, *EDIT*, *GAME*, *RADIO*, *SCRIPT*, *PARTICLES*, *PHYSICS*, *SPEAKER*, *TEXTURE\_SHADED*, *BLANK042*, *BLANK043*, *BLANK044*, *BLANK045*, *BLANK046*, *BLANK047*, *BLANK048*, *BLANK049*, *BLANK050*, *BLANK051*, *BLANK052*, *BLANK052b*, *VIEW3D*, *IPO*, *OOPS*, *BUTS*, *FILESEL*, *IMAGE\_COL*, *INFO*, *SEQUENCE*, *TEXT*, *IMASEL*, *SOUND*, *ACTION*, *NLA*, *SCRIPTWIN*, *TIME*, *NODETREE*, *LOGIC*, *CONSOLE*, *PREFERENCES*, *ASSET\_MANAGER*, *BLANK057*, *BLANK058*, *BLANK059*, *BLANK060*, *BLANK061*, *BLANK061b*, *OBJECT\_DATAMODE*, *EDITMODE\_HLT*, *FACESEL\_HLT*, *VPAIN\_T\_HLT*, *TPAIN\_T\_HLT*, *WPAIN\_T\_HLT*, *SCULPTMODE\_HLT*, *POSE\_HLT*, *PARTICLEMODE*, *LIGHTPAINT*, *BLANK063*, *BLANK064*, *BLANK065*, *BLANK066*, *BLANK067*, *BLANK068*, *BLANK069*, *BLANK070*, *BLANK071*, *BLANK072*, *BLANK073*, *BLANK074*, *BLANK075*, *BLANK076*, *BLANK077*, *BLANK077b*, *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*, *BLANK079*, *PACKAGE*, *UGLYPACKAGE*, *BLANK079b*, *BRUSH\_DATA*, *IMAGE\_DATA*, *FILE*, *FCURVE*, *FONT\_DATA*, *RENDER\_RESULT*, *SURFACE\_DATA*, *EMPTY\_DATA*, *SETTINGS*, *RENDER\_ANIMATION*, *RENDER\_STILL*, *BLANK080F*, *BOIDS*, *STRANDS*, *LIBRARY\_DATA\_INDIRECT*, *GREASEPENCIL*, *BLANK083*, *BLANK084*, *GROUP\_BONE*, *GROUP\_VERTEX*, *GROUP\_VCOL*, *GROUP\_UVS*, *BLANK089*, *BLANK090*, *RNA*, *RNA\_ADD*, *BLANK092*, *BLANK093*, *BLANK094*, *BLANK095*, *BLANK096*, *BLANK097*, *BLANK098*, *BLANK099*, *BLANK100*, *BLANK101*, *BLANK102*, *BLANK103*, *BLANK104*, *BLANK105*, *BLANK106*, *BLANK107*, *BLANK108*, *BLANK109*, *BLANK110*, *BLANK111*, *BLANK112*, *BLANK113*, *BLANK114*, *BLANK115*, *BLANK116*, *BLANK116b*, *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*, *BLANK119*, *BLANK120*, *BLANK121*, *BLANK122*, *BLANK123*, *BLANK124*, *BLANK125*, *BLANK126*, *BLANK127*, *RESTRICT\_VIEW\_OFF*, *RESTRICT\_VIEW\_ON*, *RESTRICT\_SELECT\_OFF*, *RESTRICT\_SELECT\_ON*, *RESTRICT\_RENDER\_OFF*, *RESTRICT\_RENDER\_ON*, *BLANK127b*, *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\_POSE*, *BLANK129*, *BLANK130*, *BLANK131*, *BLANK132*, *BLANK133*, *BLANK134*, *BLANK135*, *BLANK136*, *BLANK137*, *BLANK138*, *BLANK139*, *BLANK140*, *BLANK141*, *BLANK142*, *BLANK142b*, *MESH\_PLANE*, *MESH\_CUBE*, *MESH\_CIRCLE*, *MESH\_UVSPHERE*, *MESH\_ICOSPHERE*, *MESH\_GRID*, *MESH\_MONKEY*, *MESH\_CYLINDER*, *MESH\_TORUS*, *MESH\_CONE*, *BLANK610*, *BLANK611*, *LAMP\_POINT*, *LAMP\_SUN*, *LAMP\_SPOT*, *LAMP\_HEMI*, *LAMP\_AREA*, *BLANK617*, *BLANK618*, *BLANK619*, *META\_PLANE*, *META\_CUBE*, *META\_BALL*, *META\_ELLIPSOID*, *META\_CAPSULE*, *BLANK625*, *SURFACE\_NCURVE*, *SURFACE\_NCIRCLE*, *SURFACE\_NSURFACE*, *SURFACE\_NCYLINDER*, *SURFACE\_NSHERE*, *SUR-*

FACE\_NTORUS', 'BLANK636', 'BLANK637', 'BLANK638', 'CURVE\_BEZCURVE',  
'CURVE\_BEZCIRCLE', 'CURVE\_NCURVE', 'CURVE\_NCIRCLE', 'CURVE\_PATH',  
'BLANK644', 'BLANK645', 'BLANK646', 'BLANK647', 'BLANK648', 'BLANK649',  
'BLANK650', 'BLANK651', 'BLANK652', 'BLANK653', 'BLANK654', 'BLANK655',  
'FORCE\_FORCE', 'FORCE\_WIND', 'FORCE\_VORTEX', 'FORCE\_MAGNETIC',  
'FORCE\_HARMONIC', 'FORCE\_CHARGE', 'FORCE\_LENNARDJONES',  
'FORCE\_TEXTURE', 'FORCE\_CURVE', 'FORCE\_BOID', 'FORCE\_TURBULENCE',  
'FORCE\_DRAG', 'BLANK672', 'BLANK673', 'BLANK674', 'BLANK675',  
'BLANK676', 'BLANK677', 'BLANK678', 'BLANK679', 'BLANK680',  
'BLANK681', 'BLANK682', 'BLANK683', 'BLANK684', 'BLANK685', 'BLANK690',  
'BLANK691', 'BLANK692', 'BLANK693', 'BLANK694', 'BLANK695', 'BLANK696',  
'BLANK697', 'BLANK698', 'BLANK699', 'BLANK700', 'BLANK701', 'BLANK702',  
'BLANK703', 'BLANK704', 'BLANK705', 'BLANK706', 'BLANK707', 'BLANK708',  
'BLANK709', 'BLANK710', 'BLANK711', 'BLANK712', 'BLANK713', 'BLANK714',  
'BLANK715', 'BLANK720', 'BLANK721', 'BLANK722', 'BLANK733', 'BLANK734',  
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'BLANK747', 'BLANK748', 'BLANK749', 'BLANK750', 'BLANK751', 'BLANK752',  
'BLANK753', 'BLANK754', 'BLANK755', 'BLANK760', 'BLANK761', 'BLANK762',  
'BLANK763', 'BLANK764', 'BLANK765', 'BLANK766', 'BLANK767', 'BLANK768',  
'BLANK769', 'BLANK770', 'BLANK771', 'BLANK772', 'BLANK773', 'BLANK774',  
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'BLANK781', 'BLANK782', 'BLANK783', 'BLANK784', 'BLANK785', 'MOD-  
IFIER', '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', 'BLANK160', 'BLANK161',  
'BLANK162', 'BLANK163', 'BLANK164', 'BLANK165', 'BLANK166', 'BLANK167',  
'BLANK168', 'BLANK169', 'BLANK170', 'BLANK171', 'BLANK172', 'BLANK173',  
'BLANK174', 'BLANK175', 'BLANK176', 'BLANK177', 'BLANK177b', 'REC', 'PLAY',  
'FF', 'REW', 'PAUSE', 'PREV\_KEYFRAME', 'NEXT\_KEYFRAME', 'PLAY\_AUDIO',  
'PLAY\_REVERSE', 'PREVIEW\_RANGE', 'BLANK180', 'PMARKER\_ACT',  
'PMARKER\_SEL', 'PMARKER', 'MARKER\_HLT', 'MARKER', 'SPACE2', 'SPACE3',  
'BLANK181', 'KEY\_DEHLT', 'KEY\_HLT', 'MUTE\_IPO\_OFF', 'MUTE\_IPO\_ON',  
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'BLANK205', 'BLANK206', 'BLANK207', 'BLANK208', 'BLANK208b', 'VERTEXSEL',  
'EDGESEL', 'FACESEL', 'LINKEDSEL', 'BLANK210', 'ROTATE', 'CURSOR', 'RO-  
TATECOLLECTION', 'ROTATECENTER', 'ROTACTIVE', 'ALIGN', 'BLANK211',  
'SMOOTHCURVE', 'SPHERECURVE', 'ROOTCURVE', 'SHARPCURVE', 'LIN-  
CURVE', 'NOCURVE', 'RNDCURVE', 'PROP\_OFF', 'PROP\_ON', 'PROP\_CON',  
'BLANK212', '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', 'UVS\_FACE', 'STICKY\_UVS\_LOC',  
'STICKY\_UVS\_DISABLE', 'STICKY\_UVS\_VERT', 'CLIPUV\_DEHLT', 'CLIPUV\_HLT',  
'SNAP\_PEEL\_OBJECT', 'GRID', 'GEARS', 'BLANK221', 'BLANK224', 'BLANK225',  
'BLANK226', 'BLANK226b', 'PASTEDOWN', 'COPYDOWN', 'PASTEFLIPUP',

'PASTEFLIPDOWN', 'BLANK227', 'BLANK228', 'BLANK229', 'BLANK230', 'SNAP\_SURFACE', 'BLANK232', 'BLANK233', 'RETOPO', 'UV\_VERTEXSEL', 'UV\_EDGESEL', 'UV\_FACESEL', 'UV\_ISLANDSEL', 'UV\_SYNC\_SELECT', 'BLANK240', 'BLANK241', 'BLANK242', 'BLANK243', 'BLANK244', 'BLANK245', 'BLANK246', 'BLANK247', 'BLANK247b', 'BBOX', 'WIRE', 'SOLID', 'SMOOTH', 'POTATO', 'BLANK248', 'ORTHO', 'ORTHO\_OFF', 'CAMERA', 'LOCKVIEW\_OFF', 'LOCKVIEW\_ON', 'BLANK250', 'AXIS\_SIDE', 'AXIS\_FRONT', 'AXIS\_TOP', 'NDOF\_DOM', 'NDOF\_TURN', 'NDOF\_FLY', 'NDOF\_TRANS', 'LAYER\_USED', 'LAYER\_ACTIVE', 'BLANK254', 'BLANK255', 'BLANK256', 'BLANK257', 'BLANK257b', 'BLANK258', 'BLANK259', 'BLANK260', 'BLANK261', 'BLANK262', 'BLANK263', 'BLANK264', 'BLANK265', 'BLANK266', 'BLANK267', 'BLANK268', 'BLANK269', 'BLANK270', 'BLANK271', 'BLANK272', 'BLANK273', 'BLANK274', 'BLANK275', 'BLANK276', 'BLANK277', 'BLANK278', 'BLANK279', 'BLANK280', 'BLANK281', 'BLANK282', 'BLANK282b', 'SORTALPHA', 'SORTBYEXT', 'SORTTIME', 'SORTSIZE', 'LONGDISPLAY', 'SHORTDISPLAY', 'GHOST', 'IMGDISPLAY', 'BLANK284', 'BLANK285', 'BOOKMARKS', 'FONTPREVIEW', 'FILTER', 'NEWFOLDER', 'BLANK285F', 'FILE\_PARENT', 'FILE\_REFRESH', 'FILE\_FOLDER', 'FILE\_BLANK', 'FILE\_BLEND', 'FILE\_IMAGE', 'FILE\_MOVIE', 'FILE\_SCRIPT', 'FILE\_SOUND', 'FILE\_FONT', 'BLANK291b', 'BLANK292', 'BLANK293', 'BLANK294', 'BLANK295', 'BLANK296', 'BLANK297', 'BLANK298', 'BLANK299', 'BLANK300', 'BLANK301', 'BLANK302', 'BLANK303', 'BLANK304', 'BLANK305', 'BLANK306', 'BACK', 'FORWARD', 'BLANK309', 'BLANK310', 'BLANK311', 'BLANK312', 'BLANK313', 'BLANK314', 'BLANK315', 'BLANK316', 'DISK\_DRIVE', 'MATPLANE', 'MATSPHERE', 'MATCUBE', 'MONKEY', 'HAIR', 'ALIASED', 'ANTIALIASED', 'MAT\_SPHERE\_SKY', 'BLANK319', 'BLANK320', 'BLANK321', 'BLANK322', 'WORDWRAP\_OFF', 'WORDWRAP\_ON', 'SYNTAX\_OFF', 'SYNTAX\_ON', 'LINENUMBERS\_OFF', 'LINENUMBERS\_ON', 'SCRIPTPLUGINS', 'BLANK323', 'BLANK324', 'BLANK325', 'BLANK326', 'BLANK327', 'BLANK328', 'BLANK328b', 'SEQ\_SEQUENCER', 'SEQ\_PREVIEW', 'SEQ\_LUMA\_WAVEFORM', 'SEQ\_CHROMA\_SCOPE', 'SEQ\_HISTOGRAM', 'SEQ\_SPLITVIEW', 'BLANK331', 'BLANK332', 'BLANK333', 'IMAGE\_RGB', 'IMAGE\_RGB\_ALPHA', 'IMAGE\_ALPHA', 'IMAGE\_ZDEPTH', 'IMAGE\_FILE', 'BLANK336', 'BLANK337', 'BLANK338', 'BLANK339', 'BLANK340', 'BLANK341', 'BLANK342', 'BLANK343', 'BLANK344', 'BLANK345', 'BLANK346', 'BLANK346b', '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

**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 expander.

**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*, *parent=None*, *slot=None*)

Item. A preview window for materials, textures, lamps, etc.

**Parameters**

- **id** (*ID*) – ID datablock.
- **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 histogramm widget to analyze imaga 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 imaga 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\_list** (*data*, *property*, *active\_data*, *active\_property*, *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.
- **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\_reports\_banner** ()  
 template\_reports\_banner

**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`

### 1.3.574 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** 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.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`

**1.3.575 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`

### 1.3.576 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`

### 1.3.577 UnitSettings(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.UnitSettings` (*bpy\_struct*)

#### **rotation\_units**

Unit to use for displaying/editing rotation values

**Type** enum in ['DEGREES', 'RADIANS'], default 'DEGREES'

#### **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'

#### **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`

### 1.3.578 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`

### 1.3.579 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` 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** Collection of `Theme`, (readonly)

**ui\_styles**

**Type** 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`

### 1.3.580 `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

**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**

**Type** enum in ['FREE', 'AUTO', 'VECTOR', 'ALIGNED'], default 'FREE'

**keyframe\_new\_interpolation\_type**

**Type** enum in ['CONSTANT', 'LINEAR', 'BEZIER'], default 'CONSTANT'

**material\_link**

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 to that view's direction or the world coordinates

**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

**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 curves

**Type** boolean, default False



**use\_keyframe\_insert\_keyingset**

Automatic keyframe insertion using active Keying Set

**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`

### 1.3.581 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

**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 ""

**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

**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**

The default directory to search for Python scripts (resets python module search path: sys.path)

**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

**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

**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`

### 1.3.582 `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 ""

**edited\_keymaps**

**Type** Collection of `KeyMap`, (readonly)

**invert\_mouse\_wheel\_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**

The time (in ms) for a double click

**Type** int in [1, 1000], default 0

**ndof\_pan\_speed**

The overall panning speed of an NDOF device, as percent of standard

**Type** int in [0, 200], default 0

**ndof\_rotate\_speed**

The overall rotation speed of an NDOF device, as percent of standard

**Type** int in [0, 200], default 0

**select\_mouse**

The mouse button used for selection

**Type** enum in ['LEFT', 'RIGHT'], default 'RIGHT'

**use\_emulate\_numpad**

Causes the 1 to 0 keys to act as the numpad (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**

Emulates Middle Mouse with Alt+LeftMouse (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

**Type** enum in ['TURNTABLE', 'TRACKBALL'], default 'TURNTABLE'

**view\_zoom\_axis**

Axis of mouse movement to zoom in or out on

**Type** enum in ['VERTICAL', 'HORIZONTAL'], default 'VERTICAL'

**view\_zoom\_method**

Which style to use for viewport scaling

**Type** enum in ['CONTINUE', 'DOLLY', 'SCALE'], default 'CONTINUE'

**wheel\_scroll\_lines**

The 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`

### 1.3.583 `UserPreferencesSystem(bpy_struct)`

base class — `bpy_struct`

**class** `bpy.types.UserPreferencesSystem` (*bpy\_struct*)

Graphics driver and operating system settings

**audio\_channels**

Sets the audio channel count

**Type** enum in ['MONO', 'STEREO', 'SURROUND4', 'SURROUND51', 'SURROUND71'], default 'MONO'

**audio\_device**

Sets the audio output device

**Type** enum in ['NONE'], default 'NONE'

**audio\_mixing\_buffer**

Sets the number of samples used by the audio mixing buffer

**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**

Sets the audio sample format

**Type** enum in ['U8', 'S16', 'S24', 'S32', 'FLOAT', 'DOUBLE'], default 'U8'

**audio\_sample\_rate**

Sets the audio sample rate

**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

**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 use for translation

**Type** enum in ['ENGLISH', 'JAPANESE', 'DUTCH', 'ITALIAN', 'GERMAN', 'FINNISH', 'SWEDISH', 'FRENCH', 'SPANISH', 'CATALAN', 'CZECH', 'BRAZILIAN\_PORTUGUESE', 'SIMPLIFIED\_CHINESE', 'RUSSIAN', 'CROATIAN', 'SERBIAN', 'UKRAINIAN', 'POLISH', 'ROMANIAN', 'ARABIC', 'BULGARIAN', 'GREEK', 'KOREAN'], default 'ENGLISH'

#### **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** 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**

Enables automatic saving of preview images in the .blend file (Windows only)

**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 converts all new tabs into spaces for new and loaded text files

**Type** boolean, default False

**use\_textured\_fonts**

Use textures for drawing international fonts

**Type** boolean, default False

**use\_translate\_buttons**

Translate button labels

**Type** boolean, default False

**use\_translate\_toolbox**

Translate toolbox menu

**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

**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`

### 1.3.584 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 0

**manipulator\_hotspot**

Hotspot in pixels for clicking widget handles

**Type** int in [4, 40], default 0

**manipulator\_size**

Diameter of widget, in 10 pixel units

**Type** int in [2, 40], default 0

**mini\_axis\_brightness**

The brightness of the icon

**Type** int in [0, 10], default 0

**mini\_axis\_size**

The axis 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**

The 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 axis 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\_view\_name**

Show the name of the view's direction in each 3D View

**Type** boolean, default False

**smooth\_view**

The 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

**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\_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**

Forces 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`

### 1.3.585 UserSolidLight(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.UserSolidLight` (*`bpy_struct`*)

Light used for OpenGL lighting in solid draw mode

**diffuse\_color**

The diffuse color of the OpenGL light

**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

**direction**

The direction that the OpenGL light is shining

**Type** float array of 3 items in [-inf, inf], default (0.0, 0.0, 0.0)

**specular\_color**

The color of the lights 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`

### 1.3.586 ValueNodeSocket(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.ValueNodeSocket` (*bpy\_struct*)

Input or output socket of a node

**default\_value**

Default value of the socket when no link is attached

**Type** float array of 1 items in [-inf, inf], default (0.0)

**name**

Socket 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`

### 1.3.587 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.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`

## References

- `BlendData.fonts`
- `MainFonts.load`
- `MainFonts.remove`
- `TextCurve.font`

### 1.3.588 VectorNodeSocket(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.VectorNodeSocket` (*bpy\_struct*)

Input or output socket of a node

**default\_value**

Default value of the socket when no link is attached

**Type** float array of 3 items in  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

**name**

Socket 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`

### 1.3.589 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*="UVTex")

Add a vertex color layer to Mesh.

**Parameters**

- **name** (*string, (optional)*) – UV Texture 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`



### 1.3.590 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)

**name**

Vertex group 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

- `Object.vertex_groups`
- `VertexGroups.active`
- `VertexGroups.assign`
- `VertexGroups.new`

### 1.3.591 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`

### 1.3.592 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`

**assign** (*index, group, weight, type*)  
Add vertex to a vertex group.

**Parameters**

- **index** (*int array of 1 items in [-inf, inf]*) – Index List.
- **group** (`VertexGroup`) – Vertex group to add vertex to.
- **weight** (*float in [0, 1]*) – Vertex weight.
- **type** (*enum in ['REPLACE', 'ADD', 'SUBTRACT']*) – Vertex assign mode.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.593 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`

### 1.3.594 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 objects render restriction toggle (access in the outliner)

**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`

### 1.3.595 VoronoiTexture(Texture)

base classes — `bpy_struct`, `ID`, `Texture`

**class** `bpy.types.VoronoiTexture` (*Texture*)

Procedural voronoi texture

**color\_mode**

**Type** enum in ['INTENSITY', 'POSITION', 'POSITION\_OUTLINE', 'POSITION\_OUTLINE\_INTENSITY'], default 'INTENSITY'

**distance\_metric**

**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**

**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.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`

### 1.3.596 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

**Type** enum in ['EXTEND', 'CLIP', 'REPEAT'], default 'EXTEND'

**file\_format**

Format of the source data set to render

**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

**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 [-inf, inf], default (0, 0, 0)

**smoke\_data\_type**

Simulation value to be used as a texture

**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`

### 1.3.597 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.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`

### 1.3.598 WaveModifier(Modifier)

base classes — `bpy_struct`, `Modifier`

**class** `bpy.types.WaveModifier` (*Modifier*)

Wave effect modifier

**damping\_time**

**Type** float in [-300000, 300000], default 0.0

**falloff\_radius**

**Type** float in [0, inf], default 0.0

**height**

**Type** float in [-inf, inf], default 0.0

**lifetime**

**Type** float in [-300000, 300000], default 0.0

**narrowness**

**Type** float in [0, inf], default 0.0

**speed**

**Type** float in [-inf, inf], default 0.0

**start\_position\_object**

**Type** Object

**start\_position\_x**

**Type** float in [-inf, inf], default 0.0

**start\_position\_y**

**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**

**Type** float in [0, inf], default 0.0

## Inherited Properties

- `bpy_struct.id_data`
- `Modifier.name`
- `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`

### 1.3.599 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.windows`

### 1.3.600 WindowManager(ID)

base classes — `bpy_struct`, `ID`**class** `bpy.types.WindowManager` (*ID*)

Window manager datablock defining open windows and other user interface data

**clipboard****Type** string, default ""**keyconfigs**

Registered key configurations

**Type** `KeyConfigurations` collection of `KeyConfig`, (readonly)**operators**

Operator registry

**Type** Collection of `Operator`, (readonly)

**windows**

Open windows

**Type** Collection of `Window`, (readonly)

**classmethod `add_fileselect`** (*operator*)

Show up the file selector.

**Parameters**

- **operator** (`Operator`) – Operator to call.

**classmethod `add_modal_handler`** (*operator*)

`add_modal_handler`

**Parameters**

- **operator** (`Operator`) – Operator to call.

**Return type** boolean

**classmethod `invoke_props_popup`** (*operator, event*)

Operator popup invoke.

**Parameters**

- **operator** (`Operator`) – Operator to call.
- **event** (`Event`) – Event.

**Returns** result

**Return type** enum 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

**Return type** enum 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

**Return type** enum in ['RUNNING\_MODAL', 'CANCELLED', 'FINISHED', 'PASS\_THROUGH']

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.window_managers`
- `Context.window_manager`

### 1.3.601 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 [-90, 90], 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.effect\_fader
- Sequence.frame\_final\_end
- Sequence.frame\_offset\_end
- Sequence.frame\_still\_end
- 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
- 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`

### 1.3.602 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

**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**

**Type** enum in ['SOFT\_NOISE', 'HARD\_NOISE'], default 'SOFT\_NOISE'

**noisebasis\_2**

**Type** enum in ['SIN', 'SAW', 'TRI'], default 'SIN'

**turbulence**

Sets the turbulence of the bandnoise and ringnoise types

**Type** float in [0.0001, inf], default 0.0

**wood\_type**

**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.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`

### 1.3.603 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**

**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`)

**star\_settings**

World stars settings

**Type** `WorldStarsSettings`, (readonly, never None)

**texture\_slots**

Texture slots defining the mapping and influence of textures

**Type** `WorldTextureSlots` collection of `WorldTextureSlot`, (readonly)

**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  $[-inf, inf]$ , default (0.0, 0.0, 0.0)

## Inherited Properties

- `bpy_struct.id_data`
- `ID.name`
- `ID.use_fake_user`
- `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`

## References

- `BlendData.worlds`
- `MainWorlds.new`
- `MainWorlds.remove`
- `Scene.world`

### 1.3.604 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

**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 (for Approximate)

**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

**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 (for Approximate)

**Type** float in [0.0001, 10], default 0.0

**falloff\_strength**

Distance attenuation factor, the higher, the 'shorter' the shadows

**Type** float in [-inf, inf], default 0.0

**gather\_method**

**Type** enum in ['RAYTRACE', 'APPROXIMATE'], default 'RAYTRACE'

**indirect\_bounces**

Number of indirect diffuse light bounces to use for approximate ambient occlusion

**Type** int in [1, inf], 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 (for approximate ambient occlusion)

**Type** int in [0, 10], default 0

**sample\_method**

Method for generating shadow samples (for Raytrace)

**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, 32], 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 (for Approximate)

**Type** boolean, default False

**use\_environment\_light**

Add light coming from the environment

**Type** boolean, default False

**use\_falloff**

**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`

### 1.3.605 WorldMistSettings(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.WorldMistSettings` (*bpy\_struct*)

Mist settings for a World data-block

**depth**

The distance over which the mist effect fades in

**Type** float in [0, inf], default 0.0

**falloff**

Type of transition used to fade mist

**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**

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`

### 1.3.606 WorldStarsSettings(`bpy_struct`)

base class — `bpy_struct`

**class** `bpy.types.WorldStarsSettings` (*`bpy_struct`*)

Stars setting 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`

### 1.3.607 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

**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`

### 1.3.608 WorldTextureSlots(bpy\_struct)

base class — `bpy_struct`

**class** `bpy.types.WorldTextureSlots` (*bpy\_struct*)

Collection of texture slots

**classmethod** `add()`

Add a number of points to this spline.

**Returns** The newly initialized mtex.

**Return type** `WorldTextureSlot`

**classmethod** `create(index)`

Add a number of points to this spline.

**Parameters**

- **index** (*int in [0, inf]*) – Index, Slot index to initialize.

**Returns** The newly initialized mtex.

**Return type** `WorldTextureSlot`

**classmethod** `clear(index)`

Add a number of points to this spline.

**Parameters**

- **index** (*int in [0, inf]*) – Index, Slot index to clar.

## Inherited Properties

- `bpy_struct.id_data`

## Inherited Functions

- `bpy_struct.as_pointer`
- `bpy_struct.callback_add`
- `bpy_struct.callback_remove`
- `bpy_struct.driver_add`
- `bpy_struct.driver_remove`
- `bpy_struct.get`
- `bpy_struct.is_property_hidden`
- `bpy_struct.is_property_set`
- `bpy_struct.items`
- `bpy_struct.keyframe_delete`
- `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`

### 1.3.609 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`

### 1.3.610 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`

### 1.3.611 bpy\_struct

subclasses — ActionFCurves, ActionGroup, ActionGroups, ActionPoseMarkers, Actuator, Addon, Addons, AnimData, AnimViz, AnimVizMotionPaths, AnimVizOnionSkinning, AnyType, Area, ArmatureBones, ArmatureEditBones, BackgroundImage, BezierSplinePoint, BlendData, BlenderRNA, BoidRule, BoidSettings, BoidState, Bone, BoneGroup, BoneGroups, ChannelDriverVariables, ChildParticle, ClothCollisionSettings, ClothSettings, CollisionSettings, ColorRamp, ColorRampElement, ColorRampElements, ConsoleLine, Constraint, ConstraintTarget, Context, Controller, CurveMap, CurveMapPoint, CurveMapping, CurveSplines, DopeSheet, Driver, DriverTarget, DriverVariable, DupliObject, EditBone, EffectorWeights, EnumPropertyItem, EnvironmentMap, Event, FCurve, FCurveKeyframePoints, FCurveModifiers, FCurveSample, FModifier, FModifierEnvelopeControlPoint, FieldSettings, FileSelectParams, FluidSettings, Function, GPencilFrame, GPencilLayer, GPencilStroke, GPencilStrokePoint, GameObjectSettings, GameProperty, GameSoftBodySettings, GroupObjects, Header, Histogram, ID, IDMaterials, IDProperty, IDPropertyGroup, IKParam, ImageUser, KeyConfig, KeyConfigurations, KeyMap, KeyMapItem, KeyMapItems, KeyMaps, Keyframe, KeyingSet, KeyingSetInfo, KeyingSetPath, KeyingSetPaths, KeyingSets, KeyingSetsAll, LampSkySettings, LampTextureSlots, LatticePoint, Macro, MainActions, MainArmatures, MainBrushes, MainCameras, MainCurves, MainFonts, MainGroups, MainImages, MainLamps, MainLattices, MainMaterials, MainMeshes, MainMetaBalls, MainNodeTrees, MainObjects, MainParticles, MainScenes, MainTexts, MainTextures, MainWorlds, 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, NlaStrip, NlaTrack, Node, NodeSocket, ObjectBase, ObjectConstraints, ObjectModifiers, Operator, OperatorProperties, OperatorTypeMacro, PackedFile, Paint, Panel, Particle, ParticleBrush, ParticleDupliWeight, ParticleEdit, ParticleHairKey, ParticleKey, ParticleSystem, ParticleSystems, ParticleTarget, PointCache, PointCaches, PointDensity, Pose, PoseBone, PoseBoneConstraints, Property, RGBANodeSocket, Region, RegionView3D, RenderEngine, RenderLayer, RenderLayers, RenderPass, RenderResult, RenderSettings, SPHFluidSettings, SceneBases, SceneGameData, SceneObjects, SceneRenderLayer, Scopes, Sensor, Sequence, SequenceColorBalance, SequenceCrop, SequenceEditor, SequenceElement, SequenceProxy, SequenceTransform, ShapeKey, ShapeKeyBezierPoint, ShapeKeyCurvePoint, ShapeKeyPoint, SmokeCollSettings, SmokeDomainSettings, SmokeFlowSettings, SoftBodySettings, Space, SpaceUVEditor, Spline, SplineBezierPoints, SplinePoint, SplinePoints, Struct, TexMapping, TextBox, TextCharacterFormat, TextLine, TextMarker, TextureSlot, Theme, ThemeAudioWindow, ThemeBoneColorSet, ThemeConsole, ThemeDopeSheet, ThemeFileBrowser, ThemeFontStyle, ThemeGraphEditor, ThemeImageEditor, ThemeInfo, ThemeLogicEditor, ThemeNLAEditor, ThemeNodeEditor, ThemeOutliner, ThemeProperties, ThemeSequenceEditor, ThemeStyle, ThemeTextEditor, ThemeTimeline, ThemeUserInterface, ThemeUserPreferences, ThemeView3D, ThemeWidgetColors, ThemeWidgetStateColors, TimelineMarker, TimelineMarkers, ToolSettings, TransformOrientation, UILayout, UVProjector, UVTextures, UnitSettings, UnknownType, UserPreferences, UserPreferencesEdit, UserPreferencesFilePaths, UserPreferencesInput, UserPreferencesSystem, UserPreferencesView, UserSolidLight, ValueNodeSocket, VectorNodeSocket, 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 indicies or a single channel if the property is not an array.

**Returns** The driver(s) added.

**Return type** `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 indicies 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** – Optional argument for the value to return if *key* is not found.

**Note:** Only `ID`, `Bone` and `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 `ID`, `Bone` and `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

**keys** ()

Returns the keys of this objects custom properties (matches python's dictionary function of the same name).

**Returns** custom property keys.

**Return type** list of strings

**Note:** Only `ID`, `Bone` and `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_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_struct`

**values** ()

Returns the values of this objects custom properties (matches python's dictionary function of the same name).

**Returns** custom property values.

**Return type** `list`

**Note:** Only `ID`, `Bone` and `PoseBone` classes support custom properties.

**id\_data**

The `ID` object this datablock is from or None, (not available for all data types)

## 1.4 Utilities (bpy.utils)

This module contains utility functions specific to blender but not associated with blenders internal data.

`bpy.utils.addon_check` (*module\_name*)

Returns the loaded state of the addon.

**Parameters**

- **module\_name** (*string*) – The name of the addon and module.

**Returns** (`loaded_default`, `loaded_state`)

**Return type** tuple of booleans

`bpy.utils.addon_disable` (*module\_name, default\_set=True*)

Disables an addon by name.

**Parameters**

- **module\_name** (*string*) – The name of the addon and module.

`bpy.utils.addon_enable` (*module\_name, default\_set=True*)

Enables an addon by name.

**Parameters**

- **module\_name** (*string*) – The name of the addon and module.

**Returns** the loaded module or None on failier.

**Return type** module

`bpy.utils.addon_reset_all()`

Sets the addon state based on the user preferences.

`bpy.utils.blend_paths(absolute=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.

**Returns** path list.

**Return type** list of strigs

`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.

`bpy.utils.script_paths(subdir=None, user=True)`

Returns a list of valid script paths from the home directory and user preferences.

Accepts any number of string arguments which are joined to make a path.

`bpy.utils.smppte_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.smppte_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.user_resource(type, subdir)`

Returns a list of paths to external files referenced by the loaded .blend file.

**Parameters**

- **type** (*string*) – Resource type in ['DATAFILES', 'CONFIG', 'SCRIPTS', 'AUTOSAVE'].
- **subdir** (*string*) – Optional subdirectory.

**Returns** a path.

**Return type** string

`bpy.utils.user_script_path()`

## 1.5 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)`

Returns the absolute path relative to the current blend file using the “//” prefix.

`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.ensure_ext(filepath, ext, case_sensitive=False)`

Return the path with the extension added its its 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.

## 1.6 Application Data (bpy.app)

This module contains application values that remain unchanged during runtime.

- `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_date`  
The date this blender instance was built
- `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_time`  
The time this blender instance was built
- `bpy.app.build_type`  
The type of build (Release, Debug)
- `bpy.app.version`  
The Blender version as a tuple of 3 numbers. eg. (2, 50, 11)
- `bpy.app.version_string`  
The Blender version formatted as a string
- `bpy.app.build_cflags`  
constant value 'Unknown'
- `bpy.app.build_cxxflags`  
constant value 'Unknown'
- `bpy.app.build_linkflags`  
constant value 'Unknown'
- `bpy.app.build_system`  
constant value 'Unknown'
- `bpy.app.debug`  
constant value False
- `bpy.app.tempdir`  
constant value '/tmp/'

## 1.7 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.

- `bpy.props.BoolProperty` (*name=""*, *description=""*, *default=False*, *options={'ANIMATABLE'}*, *subtype='NONE'*)  
Returns a new boolean property definition.

### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE'].

- **subtype** (*string*) – Enumerator in ['UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'NONE']].

`bpy.props.BoolVectorProperty` (*name=""*, *description=""*, *default=(False, False, False)*, *options={'ANIMATABLE'}*, *subtype='NONE'*, *size=3*)

Returns a new vector boolean property definition.

#### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE']].
- **subtype** (*string*) – Enumerator in ['COLOR', 'TRANSLATION', 'DIRECTION', 'VELOCITY', 'ACCELERATION', 'MATRIX', 'EULER', 'QUATERNION', 'AXISANGLE', 'XYZ', 'COLOR\_GAMMA', 'LAYER', 'NONE']].

`bpy.props.CollectionProperty` (*items*, *type=""*, *description=""*, *default=""*, *options={'ANIMATABLE'}*)

Returns a new collection property definition.

#### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE']].
- **type** (*class*) – Dynamic type from `bpy.types`.

`bpy.props.EnumProperty` (*items*, *name=""*, *description=""*, *default=""*, *options={'ANIMATABLE'}*)

Returns a new enumerator property definition.

#### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE']].
- **items** (*sequence of string triplets*) – The items that make up this enumerator.

`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'*)

Returns a new float property definition.

#### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE']].
- **subtype** (*string*) – Enumerator in ['UNSIGNED', 'PERCENTAGE', 'FACTOR', 'ANGLE', 'TIME', 'DISTANCE', 'NONE']].
- **unit** (*string*) – Enumerator in ['NONE', 'LENGTH', 'AREA', 'VOLUME', 'ROTATION', 'TIME', 'VELOCITY', 'ACCELERATION']].

`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*)

Returns a new vector float property definition.

#### Parameters

- **options** (*set*) – Enumerator in ['HIDDEN', 'ANIMATABLE']].
- **subtype** (*string*) – Enumerator in ['COLOR', 'TRANSLATION', 'DIRECTION', 'VELOCITY', 'ACCELERATION', 'MATRIX', 'EULER', 'QUATERNION', 'AXISANGLE', 'XYZ', 'COLOR\_GAMMA', 'LAYER', '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'*)

Returns a new int property definition.

**Parameters**

- **options** (*set*) – Enumerator in [`'HIDDEN'`, `'ANIMATABLE'`].
- **subtype** (*string*) – Enumerator in [`'UNSIGNED'`, `'PERCENTAGE'`, `'FACTOR'`, `'ANGLE'`, `'TIME'`, `'DISTANCE'`, `'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*)

Returns a new vector int property definition.

**Parameters**

- **options** (*set*) – Enumerator in [`'HIDDEN'`, `'ANIMATABLE'`].
- **subtype** (*string*) – Enumerator in [`'COLOR'`, `'TRANSLATION'`, `'DIRECTION'`, `'VELOCITY'`, `'ACCELERATION'`, `'MATRIX'`, `'EULER'`, `'QUATERNION'`, `'AXISANGLE'`, `'XYZ'`, `'COLOR_GAMMA'`, `'LAYER'`, `'NONE'`].

`bpy.props.PointerProperty` (*items*, *type=""*, *description=""*, *default=""*, *options={'ANIMATABLE'}*)

Returns a new pointer property definition.

**Parameters**

- **options** (*set*) – Enumerator in [`'HIDDEN'`, `'ANIMATABLE'`].
- **type** (*class*) – Dynamic type from `bpy.types`.

`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'*)

Returns a new string property definition.

**Parameters**

- **options** (*set*) – Enumerator in [`'HIDDEN'`, `'ANIMATABLE'`].
- **subtype** (*string*) – Enumerator in [`'FILE_PATH'`, `'DIR_PATH'`, `'FILENAME'`, `'NONE'`].

# STANDALONE MODULES

## 2.1 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), 4, 'X')
mat_trans = mathutils.Matrix.Translation(vec)

mat = mat_trans * mat_rot
mat.invert()

mat3 = mat.rotation_part()
quat1 = mat.to_quat()
quat2 = mat3.to_quat()

angle = quat1.difference(quat2)

print(angle)
```

**class** `mathutils.Color`

This object gives access to Colors in Blender.

**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
```

```
# todo
```

**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.

**Parameters**

- **other** (`Euler`) – make compatible with this rotation.

**Returns** an instance of itself.

**Return type** `Euler`

**Note:** the order of eulers must match or an exception is raised.

**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.

**Returns** an instance of itself

**Return type** `Euler`

**to\_matrix()**

Return a matrix representation of the euler.

**Returns** A 3x3 rotation matrix representation of the euler.

**Return type** `Matrix`

**to\_quat()**

Return a quaternion representation of the euler.

**Returns** Quaternion representation of the euler.

**Return type** `Quaternion`

**unique()**

Calculate a unique rotation for this euler. Avoids gimble lock.

**Returns** an instance of itself

**Return type** `Euler`

**zero()**

Set all values to zero.

**Returns** an instance of itself

**Return type** `Euler`

**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
```

```
# todo
```

**classmethod** **OrthoProjection** (*plane, size, axis*)

Create a matrix to represent an orthographic projection.

**Parameters**

- **plane** (*string*) – Can be any of the following: ['X', 'Y', 'XY', 'XZ', 'YZ', 'R'], where a single axis is for a 2D matrix and 'R' requires axis is given.
- **size** (*int*) – The size of the projection matrix to construct [2, 4].
- **axis** (*Vector*) – Arbitrary perpendicular plane vector (optional).

**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, factor, size*)

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.
- **factor** (*float*) – The factor of shear to apply.
- **size** (*int*) – The size of the shear matrix to construct [2, 4].

**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*

**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.

**Returns** an instance of itself

**Return type** *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](http://en.wikipedia.org/wiki/Identity_matrix)>

**invert** ()

Set the matrix to its inverse.

**Returns** an instance of itself.

**Return type** *Matrix*

**Note:** ValueError exception is raised.

**See Also:**

<[http://en.wikipedia.org/wiki/Inverse\\_matrix](http://en.wikipedia.org/wiki/Inverse_matrix)>

**resize4x4** ()

Resize the matrix to 4x4.

**Returns** an instance of itself.

**Return type** *Matrix*

**rotation\_part** ()

Return the 3d submatrix corresponding to the linear term of the embedded affine transformation in 3d. This matrix represents rotation and scale.

**Returns** Return the 3d matrix for rotation and scale.

**Return type** *Matrix*

**Note:** Note that the (4,4) element of a matrix can be used for uniform scaling too.

**scale\_part ()**

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\_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\_quat ()**

Return a quaternion representation of the rotation matrix.

**Returns** Quaternion representation of the rotation matrix.

**Return type** `Quaternion`

**translation\_part ()**

Return a the translation part of a 4 row matrix.

**Returns** Return a the translation of a matrix.

**Return type** `Matrix`

**Note:** Note that the (4,4) element of a matrix can be used for uniform scaling too.

**transpose ()**

Set the matrix to its transpose.

**Returns** an instance of itself

**Return type** `Matrix`

**See Also:**

<<http://en.wikipedia.org/wiki/Transpose>>

**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\_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
```

```
# todo
```

**conjugate()**

Set the quaternion to its conjugate (negate x, y, z).

**Returns** an instance of itself.

**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`

**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`

**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`

**inverse** ()

Set the quaternion to its inverse.

**Returns** an instance of itself.

**Return type** `Quaternion`

**negate** ()

Set the quaternion to its negative.

**Returns** an instance of itself.

**Return type** `Quaternion`

**normalize** ()

Normalize the quaternion.

**Returns** an instance of itself.

**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\_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, 1))

# unit length vector
vec_a = vec.copy().normalize()

vec_b = mathutils.Vector((0, 1, 2))

vec2d = mathutils.Vector((1, 2))
vec3d = mathutils.Vector((1, 0, 0))
vec4d = vec_a.copy().resize4D()

# other mathutils types
quat = mathutils.Quaternion()
matrix = mathutils.Matrix()

# Comparison operators can be done on Vector classes:

# greater and less than 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
vec_a * matrix
vec_a * vec_b
vec_a * quat
-vec_a

# You can access a vector object like a sequence
x = vec_a[0]
len(vec)
vec_a[:] = vec_b
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

**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`.

**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.

**Returns** an instance of itself

**Return type** `Vector`

|  |
|--|
| <p><b>Warning:</b> 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.

**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`

**resize2D** ()

Resize the vector to 2D (x, y).

**Returns** an instance of itself

**Return type** `Vector`

**resize3D** ()

Resize the vector to 3D (x, y, z).

**Returns** an instance of itself

**Return type** `Vector`

**resize4D** ()

Resize the vector to 4D (x, y, z, w).

**Returns** an instance of itself

**Return type** `Vector`

**rotate** (*axis, angle*)

Return vector rotated around axis by angle.

**Parameters**

- **axis** (*Vector*) – rotation axis.
- **angle** (*float*) – angle in radians.

**Returns** an instance of itself

**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.

**Returns** an instance of itself

**Return type** *Vector*

**is\_wrapped**

True when this object wraps external data (readonly).

**Type** boolean

**length**

Vector Length.

**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

**ww**

Undocumented ([contribute](#))

**www**

Undocumented ([contribute](#))

**wwww**  
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**wwwx**  
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**wwwy**  
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**wx**  
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**wy**  
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**x**  
Vector X axis.  
Type float

**xw**  
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**xww**  
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**xzzz**  
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**Y**  
Vector Y axis.  
Type float

**yw** Undocumented ([contribute](#))

**yww** Undocumented ([contribute](#))

**ywww** Undocumented ([contribute](#))

**ywwx** Undocumented ([contribute](#))

**ywwy** Undocumented ([contribute](#))

**ywwz** Undocumented ([contribute](#))

**ywx** Undocumented ([contribute](#))

**ywxw** Undocumented ([contribute](#))

**ywx x** Undocumented ([contribute](#))

**ywxy** Undocumented ([contribute](#))

**ywxz** Undocumented ([contribute](#))

**ywy** Undocumented ([contribute](#))

**ywyw** Undocumented ([contribute](#))

**ywyx** Undocumented ([contribute](#))

**ywyy** Undocumented ([contribute](#))

**ywyz** Undocumented ([contribute](#))

**ywz** Undocumented ([contribute](#))

**ywzw** Undocumented ([contribute](#))

**ywzx** Undocumented ([contribute](#))

**ywzy** Undocumented ([contribute](#))

**ywzz** Undocumented ([contribute](#))

**yx**  
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**YY** Undocumented (contribute)

**YYw** Undocumented (contribute)

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**YYwx** Undocumented (contribute)

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**YYwz** Undocumented (contribute)

**YYx** Undocumented (contribute)

**YYxw** Undocumented (contribute)

**YYxx** Undocumented (contribute)

**YYxy** Undocumented (contribute)

**YYxz** Undocumented (contribute)

**YYY** Undocumented (contribute)

**YYYw** Undocumented (contribute)

**YYYx** Undocumented (contribute)

**YYYY** Undocumented (contribute)

**YYYz** Undocumented (contribute)

**YYZ** Undocumented (contribute)

**YYZw** Undocumented (contribute)

**YYZx** Undocumented (contribute)

**YYZY** Undocumented (contribute)

**YYZZ** Undocumented (contribute)

**yz**  
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Undocumented (contribute)

**yzww**  
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**yzwx**  
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**zyzy**  
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**zyyz**  
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**zyzw**  
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**zyzx**  
Undocumented (contribute)

**zyzy**  
Undocumented (contribute)

**zyzz**  
Undocumented (contribute)

- z**  
Vector Z axis (3D Vectors only).  
    **Type** float
- zw**  
Undocumented (contribute)
- zww**  
Undocumented (contribute)
- zwww**  
Undocumented (contribute)
- zwwx**  
Undocumented (contribute)
- zwwy**  
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- zwwz**  
Undocumented (contribute)
- zwx**  
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- zwxw**  
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- zwxz**  
Undocumented (contribute)
- zwy**  
Undocumented (contribute)
- zwyw**  
Undocumented (contribute)
- zwyx**  
Undocumented (contribute)
- zwyz**  
Undocumented (contribute)
- zwz**  
Undocumented (contribute)
- zwzw**  
Undocumented (contribute)
- zwzx**  
Undocumented (contribute)
- zwzy**  
Undocumented (contribute)



**zwzz**  
Undocumented ([contribute](#))

**zx**  
Undocumented ([contribute](#))

**zxw**  
Undocumented ([contribute](#))

**zxww**  
Undocumented ([contribute](#))

**zxwx**  
Undocumented ([contribute](#))

**zxwy**  
Undocumented ([contribute](#))

**zxwz**  
Undocumented ([contribute](#))

**zxx**  
Undocumented ([contribute](#))

**zxxw**  
Undocumented ([contribute](#))

**zxxx**  
Undocumented ([contribute](#))

**zxxxy**  
Undocumented ([contribute](#))

**zxxxz**  
Undocumented ([contribute](#))

**zxy**  
Undocumented ([contribute](#))

**zxyw**  
Undocumented ([contribute](#))

**zxyx**  
Undocumented ([contribute](#))

**zxyy**  
Undocumented ([contribute](#))

**zxyz**  
Undocumented ([contribute](#))

**zxxz**  
Undocumented ([contribute](#))

**zxxzw**  
Undocumented ([contribute](#))

**zxxxz**  
Undocumented ([contribute](#))

**zxxzy**  
Undocumented ([contribute](#))

**zxzz**  
Undocumented ([contribute](#))

**zy**  
Undocumented ([contribute](#))

**zyw**  
Undocumented ([contribute](#))

**zyww**  
Undocumented ([contribute](#))

**zywx**  
Undocumented ([contribute](#))

**zywy**  
Undocumented ([contribute](#))

**zywz**  
Undocumented ([contribute](#))

**zyx**  
Undocumented ([contribute](#))

**zyxw**  
Undocumented ([contribute](#))

**zyxx**  
Undocumented ([contribute](#))

**zyxy**  
Undocumented ([contribute](#))

**zyxz**  
Undocumented ([contribute](#))

**zyy**  
Undocumented ([contribute](#))

**zyyw**  
Undocumented ([contribute](#))

**zyyx**  
Undocumented ([contribute](#))

**zyyy**  
Undocumented ([contribute](#))

**zyyz**  
Undocumented ([contribute](#))

**zyz**  
Undocumented ([contribute](#))

**zyzw**  
Undocumented ([contribute](#))

**zyzx**  
Undocumented ([contribute](#))

**zyzy**  
Undocumented ([contribute](#))

**zyzz**  
Undocumented ([contribute](#))

**zz**  
Undocumented ([contribute](#))

**zzw**  
Undocumented ([contribute](#))

**zzww**  
Undocumented ([contribute](#))

**zzwx**  
Undocumented ([contribute](#))

**zzwy**  
Undocumented ([contribute](#))

**zzwz**  
Undocumented ([contribute](#))

**zzx**  
Undocumented ([contribute](#))

**zzxw**  
Undocumented ([contribute](#))

**zzxx**  
Undocumented ([contribute](#))

**zzxy**  
Undocumented ([contribute](#))

**zzxz**  
Undocumented ([contribute](#))

**zzy**  
Undocumented ([contribute](#))

**zzyw**  
Undocumented ([contribute](#))

**zzyx**  
Undocumented ([contribute](#))

**zzyy**  
Undocumented ([contribute](#))

**zzyz**  
Undocumented ([contribute](#))

**zzz**  
Undocumented ([contribute](#))

**zzzw**  
Undocumented ([contribute](#))

**zzzx**  
Undocumented ([contribute](#))

**zzzy**  
Undocumented ([contribute](#))

**zzzz**Undocumented ([contribute](#))

## 2.2 Font Drawing (blf)

This module provides access to blenders text drawing functions.

**blf.CLIPPING**  
constant value 2

**blf.KERNING\_DEFAULT**  
constant value 8

**blf.ROTATION**  
constant value 1

**blf.SHADOW**  
constant value 4

**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.

## 2.3 Audio System (aud)

This module provides access to the audaspace audio library.

`aud.AUD_DEVICE_JACK`  
constant value 3

`aud.AUD_DEVICE_NULL`  
constant value 0

`aud.AUD_DEVICE_OPENAL`  
constant value 1

`aud.AUD_DEVICE_SDL`  
constant value 2

`aud.AUD_DISTANCE_MODEL_EXPONENT`  
constant value 5

`aud.AUD_DISTANCE_MODEL_EXPONENT_CLAMPED`  
constant value 6

`aud.AUD_DISTANCE_MODEL_INVALID`  
constant value 0

`aud.AUD_DISTANCE_MODEL_INVERSE`  
constant value 1

`aud.AUD_DISTANCE_MODEL_INVERSE_CLAMPED`  
constant value 2

`aud.AUD_DISTANCE_MODEL_LINEAR`  
constant value 3

aud.**AUD\_DISTANCE\_MODEL\_LINEAR\_CLAMPED**  
constant value 4

aud.**AUD\_FORMAT\_FLOAT32**  
constant value 36

aud.**AUD\_FORMAT\_FLOAT64**  
constant value 40

aud.**AUD\_FORMAT\_INVALID**  
constant value 0

aud.**AUD\_FORMAT\_S16**  
constant value 18

aud.**AUD\_FORMAT\_S24**  
constant value 19

aud.**AUD\_FORMAT\_S32**  
constant value 20

aud.**AUD\_FORMAT\_U8**  
constant value 1

aud.**AUD\_STATUS\_INVALID**  
constant value 0

aud.**AUD\_STATUS\_PAUSED**  
constant value 2

aud.**AUD\_STATUS\_PLAYING**  
constant value 1

device()

Returns the application's `Device`.

**return** The application's `Device`.

**rtype** `Device`

**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`

`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](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 listener'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`

**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.

`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`

# GAME ENGINE MODULES

## 3.1 Game Engine `bge.types` Module

**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

**isA** (*game\_type*)

Check if this is a type or a subtype *game\_type*.

**Parameters**

- **game\_type** (*string or type*) – the name of the type or the type its self from the `bge.types` module.

**Returns** True if this object is a type or a subtype of *game\_type*.

**Return 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 that's held act as if it's 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 don't have this set.

**Type** boolean

**Note:** Order of execution between high priority controllers is not guaranteed.

**class** `bge.types.SCA_IActuator` (*SCAILogicBrick*)  
Base class for all actuator logic bricks.

**class** `bge.types.BL_ActionActuator` (*SCA\_IActuator*)  
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 pythons 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 spesific 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 myObID 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.

**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 implemented 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.

**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

**spotsizes**

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. Vertices will be split by face if necessary. Vertices 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 vertices: 6 faces with 4 vertices 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, interger]

**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 intersecton.



**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 poylgon.

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, rusty, cachingInfo, material):
```

**Parameters**

- **material** (*instance*) – The material object.

```
class PyMaterial:
    def __init__(self):
        self.pass_no = -1

    def activate(self, rusty, 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.
        #
        # rusty 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(rusty, 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 an 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 active 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\_ARMSSENSOR\_STATE\_CHANGED**

Detect that the constraint is changing state (active/inactive)

**Value** 0

**KX\_ARMSSENSOR\_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  $\geq 0$ : it is the norm of the distance between the target and the bone The rotation error on CopyPose is always  $\geq 0$ : 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** 32

Constants 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** string

This 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 ( $\leq 0$ ) when X rotation is limited (see `ik_limit_x`), read-only.

**Type** float

#### **ik\_max\_x**

maximum value of X rotation in degree ( $\geq 0$ ) when X rotation is limited (see `ik_limit_x`), read-only.

**Type** float

#### **ik\_min\_y**

minimum value of Y rotation in degree ( $\leq 0$ ) when Y rotation is limited (see `ik_limit_y`), read-only.

**Type** float

#### **ik\_max\_y**

maximum value of Y rotation in degree ( $\geq 0$ ) when Y rotation is limited (see `ik_limit_y`), read-only.

**Type** float

**ik\_min\_z**

minimum value of Z rotation in degree ( $\leq 0$ ) when Z rotation is limited (see ik\_limit\_z), read-only.

**Type** float

**ik\_max\_z**

maximum value of Z rotation in degree ( $\geq 0$ ) 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`

## 3.2 Game Engine bge.logic Module

### 3.2.1 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 `bge.types.~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
```

Matricies as used by the game engine are **row major** `matrix[row][col] = float`

`bge.types.KX_Camera` has some examples using matricies.

### 3.2.2 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.

### 3.2.3 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)`

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)

`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.addScene` (*name, overlay=1*)

Loads a scene into the game engine.

#### 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).

### 3.2.4 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

**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

## 3.2.5 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_ROTX`  
Limit X rotation

`bge.logic.KX_CONSTRAINTACT_ROTY`  
Limit Y rotation

`bge.logic.KX_CONSTRAINTACT_ROTZ`  
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

## 3.3 Game Engine bge.render Module

### 3.3.1 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, 0.5]
```

```
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)

```

### 3.3.2 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.

### 3.3.3 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.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.

## 3.4 Game Engine bge.events module

### 3.4.1 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!")
```

### 3.4.2 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

### 3.4.3 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`

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