Package 'r3js'

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Type Package

Title 'WebGL'-Based 3D Plotting using the 'three.js' Library

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Description Provides R and 'JavaScript' functions to allow 'WebGL'-based 3D plotting using the 'three.js' 'JavaScript' library. Interactivity through roll-over highlighting and toggle buttons is also supported.

License AGPL-3

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R topics documented:

`arrows3js` *Add arrows to a data3js object*

Description

Add arrows to a data3js object

Usage

```
arrows3js(
  data3js,
  from,
  to,
  lwd = 1,
  arrowhead_width = 0.2,
  arrowhead_length = 0.5,
  col = "black",
  mat = "lambert",
  ...
)
```

Arguments

`data3js`	The data3js object
`from`	nx3 matrix of coords for the arrow start points
`to`	nx3 matrix of coords for the arrow end points
`lwd`	line width
`arrowhead_width`	arrowhead width
`arrowhead_length`	arrowhead length
`col`	color
`mat`	material (see `material3js()`)
`...`	other arguments to pass to `material3js()`

Value

Returns an updated data3js object

See Also

Other plot components: `axis3js()`, `box3js()`, `grid3js()`, `legend3js()`, `light3js()`, `lines3js()`, `mtext3js()`, `points3js()`, `segments3js()`, `shape3js()`, `sphere3js()`, `surface3js()`, `text3js()`, `triangle3js()`

Examples

```
# Draw a set of arrows
from <- cbind(
  runif(10, 0.2, 0.8),
  runif(10, 0.2, 0.8),
  runif(10, 0.2, 0.8)
)

to <- jitter(from, amount = 0.2)

# Setup base plot
p <- plot3js(label_axes = FALSE)

# Add arrows
p <- arrows3js(
  p, from, to,
  arrowhead_length = 0.06,
  arrowhead_width = 0.04,
  lwd = 0.01
)

# View the plot
r3js(p, translation = c(0, 0, 0.15), zoom = 2)
```

`axis3js` *Add an axis to an r3js plot*

Description

This is used as part of the `plot3js()` function but can be called separately to add an axis, generally in combination after other lower level functions like `plot3js.new()` and `plot3js.window()`.

Usage

```
axis3js(
  data3js,
  side,
  at = NULL,
  labels = NULL,
  cornerside = "f",
  labeloffset = 0.1,
  ...
)
```

Arguments

`data3js`	The data3js object
`side`	The axis side, either "x", "y" or "z"
`at`	Where to draw labels
`labels`	Vector of labels to use
`cornerside`	See `material3js()`
`labeloffset`	Amount of offset of axis labels from the edge of the plot
`...`	Other arguments to pass to `material3js()`

Value

Returns an updated data3js object

See Also

Other plot components: `arrows3js()`, `box3js()`, `grid3js()`, `legend3js()`, `light3js()`, `lines3js()`, `mtext3js()`, `points3js()`, `segments3js()`, `shape3js()`, `sphere3js()`, `surface3js()`, `text3js()`, `triangle3js()`

background3js *Set the plot background color*

Description

Set the plot background color

Usage

```
background3js(data3js, col)
```

Arguments

data3js	The data3js object
col	The background color

Value

Returns an updated data3js object

box3js *Add a box to an r3js plot*

Description

Add a box to an r3js plot

Usage

```
box3js(
  data3js,
  sides = c("x", "y", "z"),
  dynamic = TRUE,
  col = "grey80",
  geometry = FALSE,
  renderOrder = 1,
  ...
)
```

Arguments

data3js	The data3js object
sides	The axis side to show the box, any combination of "x", "y" or "z"
dynamic	Should edges of the box closest to the viewer hide themselves automatically
col	Box color
geometry	Should the box be rendered as a physical geometry in the scene (see lines3js())
renderOrder	The render order for the box, defaults to 1
...	Other arguments to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
p <- plot3js.new()
p <- box3js(p)
r3js(p)
```

---

clippingPlane3js *Create a clipping plane object*

Description

This function can be used to create a clipping plane that can then be applied to individual objects in a plot

Usage

```
clippingPlane3js(coplanarPoints)
```

Arguments

coplanarPoints	A matrix of 3 points coplanar to the plane, each row is a point, cols are coordinates

Value

Returns an r3js clipping plane object

Examples

```
# Set up plot
p <- plot3js(
  xlim = c(-2, 2),
  ylim = c(-2, 2),
  zlim = c(-2, 2)
)

# Add a sphere with clipping planes
p <- sphere3js(
  data3js = p,
  0, 0, 0,
  radius = 2,
  col = "red",
  clippingPlanes = list(
    clippingPlane3js(
      rbind(
        c(1.5,0,1),
        c(1.5,1,1),
        c(1.5,0,0)
      )
    ),
    clippingPlane3js(
      rbind(
        c(1,1.8,1),
        c(0,1.8,1),
        c(1,1.8,0)
      )
    ),
    clippingPlane3js(
      rbind(
        c(0,-1.8,1),
        c(1,-1.8,1),
        c(1,-1.8,0)
      )
    )
  )
)

# View the plot
r3js(p, zoom = 2)
```

`grid3js` *Add axis grids to an data3js object*

Description

This is used for example by `plot3js()` to add axis grids to a plot these show along the faces of the plotting box, indicating axis ticks.

Usage

```
grid3js(
  data3js,
  sides = c("x", "y", "z"),
  axes = c("x", "y", "z"),
  at = NULL,
  dynamic = TRUE,
  col = "grey95",
  lwd = 1,
  geometry = FALSE,
  ...
)
```

Arguments

data3js	The data3js object
sides	The axis sides to show the box, any combination of "x", "y" or "z"
axes	Axes for which to draw the grid lines
at	Where to draw grid lines along the axis
dynamic	Should edges of the box closest to the viewer hide themselves automatically
col	Grid line color
lwd	Grid line width
geometry	Should the lines be rendered as a physical geometry in the scene (see `lines3js()`)
...	Other arguments to pass to `material3js()`

Value

Returns an updated data3js object

See Also

Other plot components: `arrows3js()`, `axis3js()`, `box3js()`, `legend3js()`, `light3js()`, `lines3js()`, `mtext3js()`, `points3js()`, `segments3js()`, `shape3js()`, `sphere3js()`, `surface3js()`, `text3js()`, `triangle3js()`

Examples

```
# Setup blank base plot
p <- plot3js(draw_grid = FALSE, xlab = "X", ylab = "Y", zlab = "Z")

# Add a box
p <- box3js(p)

# Add grid lines but only for the z axis
p <- grid3js(
  p, col = "red",
  axes = "z"
```

```
)

r3js(p)

# Add grid lines but only for the z axis and
# only at either end of the x axis
p <- grid3js(
  p, col = "blue",
  axes = "z",
  sides = "x"
)

r3js(p)
```

`group3js` *Start a new r3js object group*

Description

This function can be used to link plot objects together into a group in order to apply highlighting and interactive effects. See details.

Usage

```
group3js(data3js, objectIDs, groupIDs = objectIDs)
```

Arguments

`data3js`	The r3js data object
`objectIDs`	IDs for each object you want to apply the group to.
`groupIDs`	IDs for each object you want to include in the group.

Value

Returns an empty r3js group object in the form of a list.

lastID *Get the ID of the last object(s) added*

Description

Get the ID of the last object(s) added to an data3js object, this is useful when for example wanting to link different objects together into groups, you can use this function after adding each of them to keep a record of their unique plot id.

Usage

```
lastID(data3js)
```

Arguments

data3js	The data3js object

Value

Returns a vector of ID(s) for the last object added. After e.g. `sphere3js()`, this will simply be a single id relating to the sphere added, after e.g. `points3js()` this will be a vector of ids relating to each point in turn.

legend3js *Add a legend to an data3js object*

Description

Add a legend to an data3js object

Usage

```
legend3js(data3js, legend, fill)
```

Arguments

data3js	The data3js object
legend	Character vector of legend labels
fill	If supplied the fill color of a box placed next to each label

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Setup plot
p <- plot3js(
  x = iris$Sepal.Length,
  y = iris$Sepal.Width,
  z = iris$Petal.Length,
  col = rainbow(3)[iris$Species],
  xlab = "Sepal Length",
  ylab = "Sepal Width",
  zlab = "Petal Length"
)

# Add simple legend
p <- legend3js(
  data3js = p,
  legend = levels(iris$Species),
  fill = rainbow(3)
)

# View plot
r3js(p, zoom = 2)
```

---

light3js *Add a light source to a data3js object*

Description

When no light source is provided the 3d scene is lit from the top left, this function allows you to specify different numbers of light sources at different positions - not yet fully implemented.

Usage

```
light3js(
  data3js,
  position = NULL,
  intensity = 1,
  type = "directional",
  col = "white"
)
```

Arguments

data3js	The data3js object
position	Position of the light source in x, y, z coords, see details.
intensity	Light intensity
type	Type of light, either "point", "directional" or "ambient", see details.
col	Light color

Details

If light position is "directional", the default light will appear to come from the direction of the position argument but from an infinite distance. If "point" the light will appear to emanate from that position in coordinate space light a light bulb. If "ambient" any position argument is ignored and the light will light all aspects of the scene evenly from no particular position.

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Set up a plot
p0 <- plot3js(
  x = 1:4,
  y = c(2,1,3,4),
  z = c(3,2,4,1),
  xlim = c(0, 5),
  ylim = c(0, 5),
  zlim = c(0, 5),
  size = 20,
  col = c("white", "blue", "red", "green"),
  grid_col = "grey40",
  background = "black"
)

# Light scene intensely from above
p <- light3js(
  p0,
  position = c(0, 1, 0)
)
r3js(p, zoom = 2)

# Light scene positionally from the middle of the plot
p <- light3js(
  p0,
```

```
  position = c(2.5, 2.5, 2.5),
  type = "point"
)
r3js(p, zoom = 2)

# Light scene ambiently with a yellow light
p <- light3js(
  p0,
  intensity = 0.3,
  type = "ambient",
  col = "yellow"
)
r3js(p, zoom = 2)
```

`lines3js` *Add lines to a data3js object*

Description

This adds lines to a plot, similarly to the `lines()` function. You have to decide whether you would like lines to physically exist as geometries in the scene (geometry = TRUE), i.e. as cylinders, or rather as webgl lines draw into the scene (geometry = FALSE). Such lines added will be "non-geometric" in the sense that they do not physically exist in the scene, so will not be shaded according to lighting, and their width will remain constant independent of how the plot is zoomed. As with `points3js(geometry = FALSE)` lines drawn in this way are rendered much more efficiently and sometimes the fixed width characteristic is desirable, for example grid lines are drawn in this way.

Usage

```
lines3js(
  data3js,
  x,
  y,
  z,
  lwd = 1,
  col = "black",
  highlight,
  geometry = FALSE,
  ...
)
```

Arguments

`data3js`	The data3js object
`x`	x coordinates
`y`	y coordinates

z	z coordinates
lwd	line width
col	line color (only a single color is currently supported)
highlight	highlight characteristics (see highlight3ks())
geometry	logical, should the point be rendered as a physical geometry
...	further parameters to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Draw three lines
x <- seq(from = 0, to = 6, length.out = 100)
y <- cos(x*5)
z <- sin(x*5)
linecols <- rainbow(100)

p <- plot3js(
  xlim = c(0, 6),
  ylim = c(0, 6),
  zlim = c(-1, 1),
  aspect = c(1, 1, 1),
  label_axes = FALSE
)

# Add a line using the linegl representation
p <- lines3js(
  data3js = p,
  x, y + 1, z,
  col = linecols
)

# Add a thicker line using the linegl representation
p <- lines3js(
  data3js = p,
  x, y + 3, z,
  lwd = 3,
  col = linecols
)

# Add a line as a physical geometry to the plot
p <- lines3js(
```

```
  data3js = p,
  x, y + 5, z,
  lwd = 0.2,
  geometry = TRUE,
  col = "blue" # Currently only supports fixed colors
)

# View the plot
r3js(p, rotation = c(0, 0, 0), zoom = 2)
```

`material3js` *Set material properties of an r3js object*

Description

Arguments refer to different material properties for an object, many of which refer directly to properties as described in the 'threejs' documentation

Usage

```
material3js(
  mat = "phong",
  col = "black",
  fill = "black",
  opacity = NULL,
  xpd = TRUE,
  lwd = 1,
  dashSize = NULL,
  gapSize = NULL,
  interactive = NULL,
  label = NULL,
  toggle = NULL,
  depthWrite = NULL,
  depthTest = NULL,
  polygonOffset = NULL,
  polygonOffsetFactor = NULL,
  polygonOffsetUnits = NULL,
  shininess = 30,
  faces = NULL,
  corners = NULL,
  rotation = NULL,
  normalise = NULL,
  poffset = NULL,
  clippingPlanes = NULL,
  frontSide = TRUE,
  backSide = TRUE,
  renderOrder = NULL,
```

```
  ...
)
```

Arguments

mat	Material to use for the object, one of "basic", "lambert", "phong" or "line", see e.g. MeshBasicMaterial
col	Color
fill	Fill color
opacity	Opacity
xpd	Should parts of the object outside the plot limits be shown
lwd	Line width
dashSize	Dash size for dashed lines
gapSize	Gap size for dashed lines
interactive	Is the object interactive
label	The label for the object
toggle	Toggle button associated with the object
depthWrite	See depthWrite
depthTest	See depthTest
polygonOffset	See polygonOffset
polygonOffsetFactor	See polygonOffsetFactor
polygonOffsetUnits	See polygonOffsetUnits
shininess	Shininess of object surface
faces	For dynamically hidden objects, the face with which it is associated, see details.
corners	For dynamically hidden objects, the corners with which it is associated, see details.
rotation	In place rotation of the object geometry (most relevant for points)
normalise	Should coordinates be normalised to be with respect to axis ranges or placed according to the plotting box which has unit coordinates.
poffset	Positional offset, the offset is relative to the plotting area size rather than axis limits
clippingPlanes	Clipping planes to apply to the object
frontSide	Logical indicating whether the front side of a mesh should be rendered
backSide	Logical indicating whether the back side of a mesh should be rendered
renderOrder	See renderOrder
...	Additional arguments (not used)

Value

Returns a list of material properties

`mtext3js` *Add text to the margin of an r3js plot*

Description

This is used for example to add axis labels but can also be used for other purposes.

Usage

```
mtext3js(data3js, text, side, line = 0, at = 0.5, cornerside = "f", ...)
```

Arguments

`data3js`	The data3js object
`text`	The margin text
`side`	The axis side, either "x", "y" or "z"
`line`	The number of lines away from the plot edge
`at`	Position along the plot edge, defaults to 0.5 (middle)
`cornerside`	See `material3js()`
`...`	Other arguments to pass to `material3js()`

Value

Returns an updated data3js object

See Also

Other plot components: `arrows3js()`, `axis3js()`, `box3js()`, `grid3js()`, `legend3js()`, `light3js()`, `lines3js()`, `points3js()`, `segments3js()`, `shape3js()`, `sphere3js()`, `surface3js()`, `text3js()`, `triangle3js()`

Examples

```
# Create a blank plot
p <- plot3js.new()
p <- box3js(p)

# Add some margin text
p <- mtext3js(p, "0.5m", side = "x")
p <- mtext3js(p, "0.25m", side = "x", at = 0.25, line = 1)
p <- mtext3js(p, "1m", side = "y", at = 1, line = 2)
r3js(p)
```

plot3js *3D scatter / line plot*

Description

A high level method for generating a 3D scatter or line plot.

Usage

```
plot3js(
  x,
  y,
  z,
  xlim = NULL,
  ylim = NULL,
  zlim = NULL,
  xlab = NULL,
  ylab = NULL,
  zlab = NULL,
  label = NULL,
  type = "points",
  geometry = NULL,
  axislabel_line = 3,
  aspect = NULL,
  label_axes = c("x", "y", "z"),
  draw_box = TRUE,
  draw_grid = TRUE,
  grid_lwd = 1,
  grid_col = "grey90",
  axis_lwd = grid_lwd,
  box_lwd = grid_lwd,
  box_col = grid_col,
  background = "#ffffff",
  ...
)
```

Arguments

x	x coords for points / lines
y	y coords for points / lines
z	z coords for points / lines
xlim	plot x limits
ylim	plot y limits
zlim	plot z limits
xlab	x axis label

ylab	y axis label
zlab	z axis label
label	optional vector of interactive point labels
type	one of "points" or "lines"
geometry	should points and lines be represented as physical geometries? Default for points is TRUE and for lines is FALSE, see points() and lines() for more information.
axislabel_line	Distance of axis label from plot
aspect	Plot axis aspect ratio, see plot3js.window()
label_axes	Vector of axes to label, any combination of "x", "y" and "z"
draw_box	Should a box be drawn around the plot
draw_grid	Should an axis grid be drawn in the background
grid_lwd	Grid line width
grid_col	Grid line color
axis_lwd	Axis line width
box_lwd	Box line width
box_col	Box color
background	Background color for the plot
...	Further parameters to pass to material3js()

Value

Returns a data3js object, that can be plotted as a widget using print() or r3js() or further added to with the other plotting functions.

Examples

```
# Simple plot example
p <- plot3js(
  x = iris$Sepal.Length,
  y = iris$Sepal.Width,
  z = iris$Petal.Length,
  col = rainbow(3)[iris$Species],
  xlab = "Sepal Length",
  ylab = "Sepal Width",
  zlab = "Petal Length"
)

r3js(p, zoom = 2)

# Plotting with point rollover info and highlighting
p <- plot3js(
  x = USJudgeRatings$CONT,
  y = USJudgeRatings$INTG,
  z = USJudgeRatings$DMNR,
```

```
  highlight = list(
    col = "darkgreen",
    size = 2.5
  ),
  xlab = "CONT",
  ylab = "INTG",
  zlab = "DMNR",
  size = 2,
  col = "green",
  label = rownames(USJudgeRatings)
)

r3js(p, zoom = 2)
```

---

plot3js.new *Setup a new r3js plot*

Description

This function sets up a new r3js plot and returns an r3js plotting object that can later be added to using other functions such as `points3js()` and `lines3js()` etc. It is in many ways equivalent to the `plot.new()` command.

Usage

```
plot3js.new(background = "#ffffff")
```

Arguments

background	Background color to use

Value

Returns a new data3js plotting object

---

plot3js.window *Set axis limits for a data3js object*

Description

This is similar to the `plot.window()` command except that plot limits can only be set once for each plot.

Usage

```
plot3js.window(data3js, xlim, ylim, zlim, aspect = NULL)
```

Arguments

data3js	The data3js object
xlim	x axis limits
ylim	y axis limits
zlim	z axis limits
aspect	vector of length 3 giving the aspect ratio, or null to automatically set the aspect ratio such that axes have the same visual length

Value

Returns an updated data3js object

---

points3js *Add points to a data3js object*

Description

This is the base function for adding points to a plot. Alongside other parameters you will need to decide whether you want the points plotted as physical geometries (geometry = TRUE) or webgl points rendered with a shader (geometry = FALSE). Points rendered as geometries use `geopoint3js()` and will respect lighting and intersect properly, also more point types are supported but come at a larger computational cost of rendering. webgl points use `glpoints3js()` and are rendered orders of magnitude faster but have less flexible appearances and ignore lighting.

Usage

```
points3js(
  data3js,
  x,
  y,
  z,
  size = 1,
  col = "black",
  fill = col,
  shape = "sphere",
  highlight,
  geometry = TRUE,
  label = NULL,
  toggle = NULL,
  ...
)
```

Arguments

data3js	The data3js object
x	point x coords
y	point y coords
z	point z coords
size	point sizes
col	point colors
fill	point fill color
shape	point shapes, see the examples below for a list of different types.
highlight	highlight characteristics (see highlight3js())
geometry	logical, should the point be rendered as a physical geometry
label	optional vector of interactive labels to apply to the points (see highlight3js())
toggle	optional vector of interactive toggles associate to each point (see highlight3js())
...	further parameters to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
geo_shapes <- c(
  "circle", "square", "triangle",
  "circle open", "square open", "triangle open",
  "circle filled", "square filled", "triangle filled",
  "sphere", "cube", "tetrahedron",
  "cube open",
  "cube filled"
)

gl_shapes <- c(
  "circle", "square", "triangle",
  "circle open", "square open", "triangle open",
  "circle filled", "square filled", "triangle filled",
  "sphere"
)

# Setup base plot
p <- plot3js(
  xlim = c(0, length(geo_shapes) + 1),
```

```
  ylim = c(-4, 4),
  zlim = c(-4, 4),
  label_axes = FALSE
)

# Plot the different point geometries
p <- points3js(
  data3js = p,
  x = seq_along(geo_shapes),
  y = rep(0, length(geo_shapes)),
  z = rep(0, length(geo_shapes)),
  size = 2,
  shape = geo_shapes,
  col = rainbow(length(geo_shapes)),
  fill = "grey70"
)

r3js(p, rotation = c(0, 0, 0), zoom = 2)

# Setup base plot
p <- plot3js(
  xlim = c(0, length(gl_shapes) + 1),
  ylim = c(-4, 4),
  zlim = c(-4, 4),
  label_axes = FALSE
)

# Plot the different gl points
p <- points3js(
  data3js = p,
  x = seq_along(gl_shapes),
  y = rep(0, length(gl_shapes)),
  z = rep(0, length(gl_shapes)),
  size = 2,
  shape = gl_shapes,
  col = rainbow(length(gl_shapes)),
  fill = "grey50",
  geometry = FALSE
)

r3js(p, rotation = c(0, 0, 0), zoom = 2)

# Plot a 10,000 points using the much more efficient gl.point representation

# Setup base plot
p <- plot3js(
  xlim = c(-4, 4),
  ylim = c(-4, 4),
  zlim = c(-4, 4),
  label_axes = FALSE
)

p <- points3js(
```

```
  data3js = p,
  x = rnorm(10000, 0),
  y = rnorm(10000, 0),
  z = rnorm(10000, 0),
  size = 0.6,
  col = rainbow(10000),
  shape = "sphere",
  geometry = FALSE
)

r3js(p, rotation = c(0, 0, 0), zoom = 2)
```

`r3js` *Plot a data3js object*

Description

This function takes the assembled data3js object and plots it as an htmlwidget.

Usage

```
r3js(
  data3js,
  rotation = c(-1.45, 0, -2.35),
  zoom = 2,
  translation = c(0, 0, 0),
  styles = list(),
  title = "R3JS viewer",
  ...
)
```

Arguments

`data3js`	The data3js object
`rotation`	Plot starting rotation as an XYZ Euler rotation
`zoom`	Plot starting zoom factor
`translation`	Plot starting translation
`styles`	List of styles controlling elements of the plot, see examples
`title`	Title for the viewer
`...`	Additional arguments to pass to `htmlwidgets::createWidget()`

Value

Returns an html widget of the plot

Examples

```
# Control toggle button appearance
r3js(
  plot3js(
    x = iris$Sepal.Length,
    y = iris$Sepal.Width,
    z = iris$Petal.Length,
    col = rainbow(3)[iris$Species],
    xlab = "Sepal Length",
    ylab = "Sepal Width",
    zlab = "Petal Length",
    toggle = iris$Species
  ),
  styles = list(
    toggle div = list(
      bottom = "4px",
      right = "4px"
    ),
    toggles = list(
      setosa = list(
     on  = list(backgroundColor = colorspace::darken(rainbow(3)[1], 0.1), color = "white"),
     off = list(backgroundColor = colorspace::lighten(rainbow(3)[1], 0.8), color = "white")
      ),
      versicolor = list(
     on  = list(backgroundColor = colorspace::darken(rainbow(3)[2], 0.1), color = "white"),
     off = list(backgroundColor = colorspace::lighten(rainbow(3)[2], 0.8), color = "white")
      ),
      virginica = list(
     on  = list(backgroundColor = colorspace::darken(rainbow(3)[3], 0.1), color = "white"),
     off = list(backgroundColor = colorspace::lighten(rainbow(3)[3], 0.8), color = "white")
      )
    )
  ),
  zoom = 1.5
)
```

`r3js-shiny` *Shiny bindings for r3js*

Description

Output and render functions for using r3js within Shiny applications and interactive Rmd documents.

Usage

```
r3jsOutput(outputId, width = "100%", height = "400px")

renderR3js(expr, env = parent.frame(), quoted = FALSE)
```

Arguments

outputId	output variable to read from
width, height	Must be a valid CSS unit (like '100%', '400px', 'auto') or a number, which will be coerced to a string and have 'px' appended.
expr	An expression that generates a r3js
env	The environment in which to evaluate expr.
quoted	Is expr a quoted expression (with quote())? This is useful if you want to save an expression in a variable.

Value

An output or render function that enables the use of the widget within Shiny applications.

---

save3js *Save an r3js plot to an HTML file*

Description

Converts r3js plot data to a widget and saves it to an HTML file (e.g. for sharing with others)

Usage

```
save3js(
  data3js,
  file,
  title = "r3js plot",
  selfcontained = TRUE,
  libdir = NULL,
  ...
)
```

Arguments

data3js	The r3js data object to be saved
file	File to save HTML into
title	Text to use as the title of the generated page
selfcontained	Whether to save the HTML as a single self-contained file (with external resources base64 encoded) or a file with external resources placed in an adjacent directory.
libdir	Directory to copy HTML dependencies into (defaults to filename_files)
...	Further arguments to pass to r3js()

Value

No return value, called for the side-effect of saving the plot.

save3jsWidget *Save an r3js widget to an HTML file*

Description

Save a rendered r3js widget to an HTML file (e.g. for sharing with others). This is mostly a wrapper for saveWidget.

Usage

```
save3jsWidget(
  widget,
  file,
  title = "r3js plot",
  selfcontained = TRUE,
  libdir = NULL,
  ...
)
```

Arguments

widget	Widget to save
file	File to save HTML into
title	Text to use as the title of the generated page
selfcontained	Whether to save the HTML as a single self-contained file (with external resources base64 encoded) or a file with external resources placed in an adjacent directory
libdir	Directory to copy HTML dependencies into (defaults to filename_files)
...	Further arguments to pass to saveWidget

Value

No return value, called for the side-effect of saving the plot.

segments3js *Add lines segments a 3js object*

Description

Add lines segments a 3js object

Usage

```
segments3js(
  data3js,
  x,
  y,
  z,
  lwd = 1,
  col = "black",
  highlight,
  geometry = FALSE,
  ...
)
```

Arguments

data3js	The data3js object
x	x coords
y	y coords
z	z coords
lwd	line width
col	line color
highlight	highlight characteristics (see highlight3ks())
geometry	logical, should the lines be rendered as a physical geometries
...	further parameters to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), shape3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Draw three lines
x <- seq(from = 0, to = 6, length.out = 100)
y <- cos(x*5)
z <- sin(x*5)
linecols <- rainbow(100)

p <- plot3js(
  xlim = c(0, 6),
  ylim = c(0, 6),
  zlim = c(-1, 1),
```

```
  aspect = c(1, 1, 1),
  label_axes = FALSE
)

# Add a line using the linegl representation
p <- segments3js(
  data3js = p,
  x, y + 1, z,
  col = linecols
)

# Add a thicker line using the linegl representation
p <- segments3js(
  data3js = p,
  x, y + 3, z,
  lwd = 3,
  col = linecols
)

# Add a line as a physical geometry to the plot
p <- segments3js(
  data3js = p,
  x, y + 5, z,
  lwd = 0.2,
  geometry = TRUE,
  col = "blue" # Currently only supports fixed colors
)

# View the plot
r3js(p, rotation = c(0, 0, 0), zoom = 2)
```

---

shape3js *Add a generic shape to an 3js plot*

Description

Add a generic shape to an 3js plot

Usage

```
shape3js(
  data3js,
  vertices,
  faces,
  normals = NULL,
  col = "black",
  highlight,
  ...
)
```

Arguments

data3js	The data3js object
vertices	An nx3 matrix of 3d vertex coordinates
faces	An nx3 matrix of indices relating to vertices that make up each triangular face
normals	Optional nx3 matrix of normals to each vertex
col	Shape color
highlight	highlight attributes (see highlight3js())
...	Additional attributes to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), sphere3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Draw a teapot
data(teapot)
p <- plot3js(
  xlim = range(teapot$vertices[,1]),
  ylim = range(teapot$vertices[,2]),
  zlim = range(teapot$vertices[,3]),
  label_axes = FALSE,
  aspect = c(1, 1, 1)
)

p <- shape3js(
  p,
  vertices = teapot$vertices,
  faces = teapot$edges,
  col = "lightblue"
)

r3js(p, rotation = c(-2.8, 0, 3.14), zoom = 1.2)
```

sphere3js *Add a sphere of defined radius to a data3js object*

Description

Unlike points3js, where geometric points can also be represented as spheres, this adds sphere that is sized with respect to the actual dimensions of the plotting space (and so if aspect ratios differ for each axis may not actually appear sphere-like).

Usage

```
sphere3js(data3js, x, y, z, radius, col = "black", highlight, ...)
```

Arguments

data3js	The data3js object
x	x coordinate of the sphere center
y	y coordinate of the sphere center
z	z coordinate of the sphere center
radius	sphere radius
col	color
highlight	highlight attributes (see highlight3js())
...	other arguments to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), surface3js(), text3js(), triangle3js()

Examples

```
# Setup base plot
p <- plot3js(
  xlim = c(-10, 10),
  ylim = c(-5, 5),
  zlim = c(-8, 8)
)

# Add sphere (this will look distorted because of axis scaling)
p <- sphere3js(
  data3js = p,
```

```
  0, 0, 0,
  radius = 5,
  col = "green"
)

r3js(p, zoom = 2.5)

# Setup base plot with equal aspect ratio
p <- plot3js(
  xlim = c(-10, 10),
  ylim = c(-5, 5),
  zlim = c(-8, 8),
  aspect = c(1, 1, 1)
)

# Add sphere (fixed aspect ratio now makes the sphere look spherical)
p <- sphere3js(
  data3js = p,
  0, 0, 0,
  radius = 5,
  col = "green"
)

r3js(p, zoom = 2)
```

`surface3js` *Add a surface to an data3js object*

Description

This function behaves very similarly to the `surface3d` function in the `rgl` package, although the handling of NA values are handled differently.

Usage

```
surface3js(
  data3js,
  x,
  y,
  z,
  col = "black",
  mat,
  wireframe = FALSE,
  highlight,
  ...
)
```

Arguments

data3js	The data3js object
x	Values corresponding to rows of z, or matrix of x coordinates
y	Values corresponding to the columns of z, or matrix of y coordinates
z	Matrix of heights
col	The color of the surface as either a single value, vector or matrix.
mat	The material to use when drawing the matrix, for a solid surface the default is "phong", for a wireframe the default is "line".
wireframe	Logical value for if the surface should be displayed as a mesh
highlight	highlight attributes (see highlight3js())
...	Material and texture properties. See material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), text3js(), triangle3js()

Examples

```
# volcano example taken from "persp"
z <- 2 * volcano        # Exaggerate the relief
x <- 10 * (1:nrow(z))   # 10 meter spacing (S to N)
y <- 10 * (1:ncol(z))   # 10 meter spacing (E to W)

zlim <- range(z)
zlen <- zlim[2] - zlim[1] + 1

colorlut <- terrain.colors(zlen) # height color lookup table
col <- colorlut[ z - zlim[1] + 1 ] # assign colors to heights for each point

p <- plot3js(
  xlim = range(x),
  ylim = range(y),
  zlim = range(z),
  label_axes = FALSE,
  aspect = c(1, 1, 1) # Maintain a constant aspect ratio
)

p <- surface3js(
  data3js = p,
  x, y, z,
  col = col
)
```

```
r3js(
  data3js = p,
  rotation = c(-1.15, 0, -0.65),
  zoom = 1.5
)
```

`teapot` *Utah Teapot*

Description

The Utah teapot is a classic computer graphics example. This data set contains a representation in terms of triangles. This is taken from the `misc3d` package.

Usage

```
teapot
```

Format

A list with components vertices and edges. vertices is a 1976 by 3 numeric matrix of the coordinates of the vertices. edges is a 3751 by 3 integer matrix of the indices of the triangles.

Source

Taken from the `misc3d` package

`text3js` *Add text to a data3js object*

Description

The text added can either be as an html text object, superimposed on the scene but moving relative to appear relative to the specified coordinqtes, or an actual geometry, which will appear in the scene, zoom and rotate with it etc.

Usage

```
text3js(
  data3js,
  x,
  y,
  z,
  text,
  size = NULL,
  col = "inherit",
  toggle = NULL,
  type = "geometry",
  alignment = "center",
  offset = c(0, 0),
  style = list(fontFamily = "sans-serif"),
  ...
)
```

Arguments

data3js	The data3js object
x	x coords
y	y coords
z	z coords
text	character vector of text
size	text size, if type is "geometry" this is interpreted in terms of text height within the plotting space (default 1), if type is "html" then this is interpreted as size in pts (default 16).
col	text color
toggle	associated text toggle button
type	text type, either "geometry" or "html"
alignment	text alignment, i.e. "left" "top" "topright"
offset	onscreen text offset for html text, x then y
style	named list of css style attributes to apply to the html text
...	Additional attributes to pass to `material3js()`

Value

Returns an updated data3js object

See Also

Other plot components: `arrows3js()`, `axis3js()`, `box3js()`, `grid3js()`, `legend3js()`, `light3js()`, `lines3js()`, `mtext3js()`, `points3js()`, `segments3js()`, `shape3js()`, `sphere3js()`, `surface3js()`, `triangle3js()`

Examples

```
# Set text parameters
x <- 1:4
y <- rep(0, 4)
z <- rep(0, 4)
labels <- LETTERS[1:4]
sizes <- c(0.4, 0.6, 0.8, 1)

# Create empty plot
p0 <- plot3js(
  xlim = c(0, 5),
  ylim = c(-1, 1),
  zlim = c(-1, 1),
  aspect = c(1, 1, 1),
  label_axes = FALSE
)

# Add text as a geometry
p <- text3js(
  data3js = p0,
  x = x,
  y = y,
  z = z,
  size = sizes,
  text = labels
)

r3js(p, rotation = c(0, 0, 0), zoom = 1)

# Add text as a html labels
p <- text3js(
  data3js = p0,
  x = x,
  y = y,
  z = z,
  size = sizes*40,
  text = labels,
  type = "html"
)

r3js(p, rotation = c(0, 0, 0), zoom = 1)
```

---

triangle3js *Add a triangle to a data3js object*

Description

Add a triangle to a data3js object

Usage

```
triangle3js(data3js, vertices, col = "black", highlight, ...)
```

Arguments

data3js	The data3js object
vertices	An nx3 matrix of triangle vertices
col	Single color for the triangles or vector of vertex colors
highlight	highlight attributes (see highlight3js())
...	Additional attributes to pass to material3js()

Value

Returns an updated data3js object

See Also

Other plot components: arrows3js(), axis3js(), box3js(), grid3js(), legend3js(), light3js(), lines3js(), mtext3js(), points3js(), segments3js(), shape3js(), sphere3js(), surface3js(), text3js()

Examples

```
# Draw some random triangles
M <- matrix(
  data = rnorm(36),
  ncol = 3,
  nrow = 12
)

p <- plot3js(
  xlim = range(M[,1]),
  ylim = range(M[,2]),
  zlim = range(M[,3]),
  label_axes = FALSE
)

p <- triangle3js(
  p,
  vertices = M,
  col = rainbow(nrow(M))
)

r3js(p, zoom = 2)
```

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