Package 'arrowheadr'

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Type Package

Title Make Custom Arrowheads

Version 1.0.2

Description The 'ggarrow' package is a 'ggplot2' extension that plots a variety of different arrow segments with many options to customize. The 'arrowheadr' package makes it easy to create custom arrowheads and fins within the parameters that 'ggarrow' functions expect. It has preset arrowheads and a collection of functions to create and transform data for customizing arrows.

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URL https://github.com/wjschne/arrowheadr, https://wjschne.github.io/arrowheadr/

BugReports https://github.com/wjschne/arrowheadr/issues

Depends R (>= 2.10)

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`arrow_head_bezier` *make arrowhead from list of bezier control points*

Description

make arrowhead from list of bezier control points

Usage

```
arrow_head_bezier(
  x,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("rotater", "rescaler", "nudger"),
  n = 101,
  plot = FALSE,
  show_controls = TRUE
)
```

Arguments

x	list of control points (as vectors or matrices)
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in each bezier curve
plot	plot arrowhead if TRUE
show_controls	show control points if plot = TRUE

Value

a matrix

Examples

```
curved_arrowhead <- arrow_head_bezier(list(
  c(1,  0,
    .5, .5,
    .2, .5),
  c(.2, .5,
    .2, .1,
    -.1, .25,
    -.3, .25),
  c(-.3, .25,
    0, 0,
    -.3, -.25),
  c(-.3, -.25,
    -.1, -.25,
    .2,  -.1,
    .2, -.5),
  c(.2, -.5,
    .5, -.5,
    1,  0)
),
plot = TRUE)
```

---

arrow_head_catenary *Make catenary arrowhead*

Description

Make catenary arrowhead

Usage

```
arrow_head_catenary(
  a = 1,
  base_width = 0,
  thickness = 1.2,
  closed = FALSE,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)
```

Arguments

a	peakedness of the arch (near 0 is more flat, large like parabola)
base_width	width of the base of the arch
thickness	thickness of the top of the arch
closed	if TRUE, closed arch
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
catenary <- arrow_head_catenary(plot = TRUE)
stlouis <-
  arrow_head_catenary(
    plot = TRUE,
    a = 0.4,
    base_width = 0.2,
    thickness = .09
  )

bluntnosed_catenary <-
  arrow_head_catenary(
    plot = TRUE,
    a = .2,
```

```
  thickness = 1.2
)
```

`arrow_head_ellipse` *Make arrrowhead with ellipse*

Description

Make arrrowhead with ellipse

Usage

```
arrow_head_ellipse(
  a = 1,
  b = 1,
  superellipse = 2,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)
```

Arguments

`a`	width of ellipse
`b`	height of ellipse
`superellipse`	parameter for specifying superellipses. Can be of length 1 or 2
`rotate`	rotation angle in radians
`rescale`	a single value or 2-length vector for scaling in x and y
`nudge`	a single value or 2-length vector for nudging in x and y
`transformations`	a vector of transformation functions
`n`	number of points in polygon
`plot`	plot arrowhead if TRUE

Value

a matrix

Examples

```
ellipsehead <- arrow_head_ellipse(plot = TRUE, b = .5)
ellipsehead_spaced <- arrow_head_ellipse(
  plot = TRUE,
  b = .5,
  rescale = .45,
  nudge = c(.55, 0)
)
# Make regular polygon with n - 1 sides
pentagon <- arrow_head_ellipse(n = 6, plot = TRUE)
# make a superellipses
star4 <- arrow_head_ellipse(superellipse = .5, plot = TRUE)
squircle <- arrow_head_ellipse(superellipse = 3, plot = TRUE, rotate = pi / 4)
longboat <- arrow_head_ellipse(plot = TRUE, b = 1, a = 4, superellipse = c(3,.5))
```

---

arrow_head_function *Make arrowheads with any function*

Description

Make arrowheads with any function

Usage

```
arrow_head_function(
  .fun = stats::dnorm,
  lower_bound = -4,
  upper_bound = 4,
  ...,
  base_width = 0,
  thickness = 1.2,
  closed = TRUE,
  minimum_value = NA,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("rotater", "rescaler", "nudger"),
  n = 1001,
  plot = FALSE
)
```

Arguments

.fun	a function (defaults to dnorm)
lower_bound	lowest value passed to .fun
upper_bound	highest value passed to .fun
...	arguments passed to .fun

base_width	If closed, size of feet
thickness	If closed, thickness of shape (can be negative)
closed	make polygon closed
minimum_value	smallest value in function
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
# A normal distribution
xy <- arrow_head_function(dnorm, plot = TRUE)
# if closed = FALSE, set thickness and base_width
xy <- arrow_head_function(dnorm, plot = TRUE, closed = FALSE,
                    thickness = 1.5,
                    base_width = .25)

# A cauchy distribution
xy <- arrow_head_function(dt, df = 1, plot = TRUE)
# open with thickness = 1.5
xy <- arrow_head_function(
  dt,
  df = 1,
  plot = TRUE,
  closed = FALSE,
  thickness = 1.5
)
# thickness > 2 creates a bulge
xy <- arrow_head_function(
  dt,
  df = 1,
  lower_bound = -3.25,
  upper_bound = 3.25,
  closed = FALSE,
  thickness = 2.5,
  plot = TRUE,
  rescale = 1 / 3,
  nudge = c(2 / 3, 0)
)

# Make a new function
```

```
mytrident <- function(x, s = 160) {
  k <- length(x)
  y1 <- dbeta(x, shape1 = s, shape2 = s) * 2
  y2 <- dbeta(x, shape1 = s * .9, shape2 = s * .1)
  y3 <- dbeta(x, shape1 = s * .1 , shape2 = s * .9)
  y1 + y2 + y3
}

xy <- arrow_head_function(
  mytrident,
  lower_bound = 0,
  upper_bound = 1,
  plot = TRUE,
  minimum_value = -3,
  rescale = .5,
  nudge = c(.5, 0)
)
```

`arrow_head_harpoon` *Make a harpoon arrowhead*

Description

Make a harpoon arrowhead

Usage

```
arrow_head_harpoon(
  point_angle = 30,
  barb_angle = 20,
  degrees = TRUE,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  plot = FALSE
)
```

Arguments

`point_angle`	angle of harpoon point
`barb_angle`	angle of harpoon barb
`degrees`	if TRUE, angles are in degrees instead of radians
`rotate`	rotation angle in radians
`rescale`	a single value or 2-length vector for scaling in x and y
`nudge`	a single value or 2-length vector for nudging in x and y
`transformations`	a vector of transformation functions
`plot`	plot arrowhead if TRUE

Value

a matrix

Examples

```
xy <- arrow_head_harpoon(plot = TRUE)
```

`arrow_head_hypotrochoid` *Make spirograph arrowheads*

Description

Make spirograph arrowheads

Usage

```
arrow_head_hypotrochoid(
  r = 4,
  R = 3,
  d = r,
  windings = r,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)

arrow_head_deltoid(
  d = 2.6,
  rotate = pi,
  rescale = c(1, 0.5),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)
```

Arguments

`r`	cycling circle radius
`R`	fixed circle radius
`d`	pen distance
`windings`	windings

rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
star5 <- arrow_head_hypotrochoid(plot = TRUE, rotate = pi)
star5_long <- arrow_head_hypotrochoid(
   plot = TRUE,
   r = 4,
   R = 3,
   rotate = pi,
   rescale = c(1, .4)
   )
deltoid_long <- arrow_head_deltoid(plot = TRUE, rescale = c(1,1))
deltoid_long <- arrow_head_deltoid(plot = TRUE)
deltoid_spaced <- arrow_head_deltoid(plot = TRUE,
                                     rescale = c(.6,.3),
                                     nudge = c(.4, 0))
```

---

arrow_head_icon *Make arrowhead from preset icon*

Description

Make arrowhead from preset icon

Usage

```
arrow_head_icon(
  x = "stardestoyer",
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("rotater", "rescaler", "nudger"),
  plot = FALSE
)
```

Arguments

x	name of icon: eiffel, viper, viper2, nighthawk, pantherxf70
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
starwars_stardestoyer <- arrow_head_icon(x = "stardestoyer", plot = TRUE)
starwars_executor <- arrow_head_icon(x = "executor", plot = TRUE)
eiffel <- arrow_head_icon(x = "eiffel", plot = TRUE)
battlestar_galactica_viper <- arrow_head_icon(x = "viper", plot = TRUE)
battlestar_galactica_viper2 <- arrow_head_icon(x = "viper2", plot = TRUE)
nighthawk <- arrow_head_icon(x = "nighthawk", plot = TRUE)
panther_xf70 <- arrow_head_icon(x = "pantherxf70", plot = TRUE)
```

---

arrow_head_latex *Make latex arrowhead*

Description

Mimics tikz's latex arrowheads, but can make any arrowhead with 2 side curves and an underside.

Usage

```
arrow_head_latex(
  point = c(1, 0),
  sidecontrols = c(7/12, 1/12, -1/6, 1/4),
  p_barb = c(-2/3, 5/8),
  undercontrols = c(-1/4, 1/6),
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("rotater", "rescaler", "nudger"),
  n = 101,
  plot = FALSE
)
```

Arguments

point	length-2 vector for point coordinates
sidecontrols	vector of coordinates for control points on sides
p_barb	length-2 vector for barb coordinates
undercontrols	vector of coordinates for control points on underside
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
latex_prime <- arrow_head_latex(plot = TRUE)
latex_prime_spaced <-
  arrow_head_latex(nudge = c(.45, 0),
                   rescale = .55,
                   plot = TRUE)
latex_regular <- arrow_head_latex(undercontrols = NULL, plot = TRUE)


latex_flat <- arrow_head_latex(sidecontrols = NULL, plot = TRUE)
latex_pincer <- arrow_head_latex(
  sidecontrols = c(-.5,1, -.5, 2),
  undercontrols = c(.2,1.5),
  p_barb = c(-1,.5),
  nudge = c(.35,0),
  rescale = c(.65,.4),
  plot = TRUE)
```

---

arrow_head_trefoil *Make trefoil arrowhead*

Description

Make trefoil arrowhead

Usage

```
arrow_head_trefoil(
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)
```

Arguments

rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
trefoil <- arrow_head_trefoil(plot = TRUE)
```

---

arrow_head_wittgenstein_rod

Make arrowhead with Wittengenstein's Rod

Description

See https://en.wikipedia.org/wiki/Wittgenstein's_rod

Usage

```
arrow_head_wittgenstein_rod(
  fixed_point = c(1.1, 0),
  rod_length = 2.1,
  rotate = 0,
  rescale = c(1, 1),
  nudge = c(0, 0),
  transformations = c("unitizer", "rotater", "rescaler", "nudger"),
  n = 361,
  plot = FALSE
)
```

Arguments

fixed_point	x and y coordinates of a point
rod_length	Length of rod
rotate	rotation angle in radians
rescale	a single value or 2-length vector for scaling in x and y
nudge	a single value or 2-length vector for nudging in x and y
transformations	a vector of transformation functions
n	number of points in polygon
plot	plot arrowhead if TRUE

Value

a matrix

Examples

```
candleflame <- arrow_head_wittgenstein_rod(
  fixed_point = c(-2.75, 0),
  rod_length = 3.75,
  nudge = c(1, 0),
  rescale = .95,
  plot = TRUE
)


rocket <- arrow_head_wittgenstein_rod(
  fixed_point = c(1.1, 0),
  rod_length = 2.1,
  plot = TRUE,
  nudge = c(.1, 0),
  rescale = c(.90, .25)
)
```

---

nudger *Nudge columns of a matrix by fixed amounts*

Description

Nudge columns of a matrix by fixed amounts

Usage

```
nudger(x, nudge)
```

Arguments

x	a matrix
nudge	a single value or a vector with length equal to the number of columns in x

Value

matrix

Examples

```
nudger(matrix(0, nrow = 2, ncol = 2), nudge = c(0,1))
```

---

plot_arrowhead *Plot arrowhead*

Description

Plot arrowhead

Usage

```
plot_arrowhead(x, displayline = TRUE, displaypoints = TRUE)
```

Arguments

x	2-column matrix
displayline	plot the display line
displaypoints	plot the 0,0 point and the 1,0 point

Value

plot

reflecter *make a reflection of a matrix on the y axis*

Description

Good for making symmetrical arrowheads

Usage

```
reflecter(x, add_reflection = TRUE)
```

Arguments

x	matrix
add_reflection	add to x in reverse order

Value

a matrix with y reversed sign and rows in reverse order

Examples

```
reflecter(diag(c(1,2)))
```

rescaler *Rescale each column of a matrix*

Description

Rescale each column of a matrix

Usage

```
rescaler(x, magnitude)
```

Arguments

x	a matrix
magnitude	a single value or a vector with length equal to the number of columns in x

Value

a matrix

Examples

```
rescaler(matrix(1, nrow = 2, ncol = 2), magnitude = c(2,3))
```

rev_matrix_rows *reverses the order of rows or columns in a matrix*

Description

reverses the order of rows or columns in a matrix

Usage

```
rev_matrix_rows(x)

rev_matrix_cols(x)
```

Arguments

x	matrix

Value

a matrix

Examples

```
rev_matrix_rows(diag(c(1,2)))
```

rotater *Rotate a 2-column matrix*

Description

Rotate a 2-column matrix

Usage

```
rotater(x, theta, center = c(0, 0), degrees = FALSE)
```

Arguments

x	a 2-column matrix
theta	angle
center	point of rotation
degrees	if TRUE, theta is in degrees instead of radians

Value

a rotated 2-column matrix

Examples

```
x <- matrix(seq(10), ncol = 2)
rotater(x, pi)
```

`transformer` *Do transformations in a desired order*

Description

Do transformations in a desired order

Usage

```
transformer(
  x,
  rescale = c(1, 1),
  rotate = 0,
  nudge = 0,
  center = c(0, 0),
  degrees = FALSE,
  transformations = c("unitizer", "rescaler", "nudger", "rotater")
)
```

Arguments

`x`	a 2-column matrix
`rescale`	a single value or a vector with length equal to the number of columns in x
`rotate`	angle in radians unless degrees is true
`nudge`	a single value or a vector with length equal to the number of columns in x
`center`	a single value or a vector with length equal to the number of columns in x
`degrees`	if TRUE, angles are degrees instead of radians
`transformations`	a vector of transformation functions

Value

a matrix

Examples

```
xy <- matrix(c(0,0,1,1), nrow = 2)
transformer(xy, transformations = "rotater", rotate = pi)
```

unitizer *Fit matrix to unit circle*

Description

Fit matrix to unit circle

Usage

```
unitizer(x, center = rep(0, ncol(x)))
```

Arguments

x	matrix
center	center of matrix

Value

matrix

Examples

```
A = matrix(c(1, 2,
             -8,6,
              9,5),
             ncol = 2,
             byrow = TRUE)
unitizer(A)
cA <- unitizer(A, center = colMeans(A))
plot(cA, xlim = c(-1, 1), ylim = c(-1, 1))
t <- seq(0,2*pi, length.out = 361)
lines(cos(t), sin(t))
```

v2matrix *Convert a vector to a matrix*

Description

Convert a vector to a matrix

Usage

```
v2matrix(x, ncol = 2, byrow = TRUE)
```

Arguments

x	vector
ncol	number of columns
byrow	logical. convert by row

Value

a matrix

Examples

```
v2matrix(c(1,2,3,4))
```

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