Package 'IDPmisc'

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Title 'Utilities of Institute of Data Analyses and Process Design (www.zhaw.ch/idp)'

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Description Different high-level graphics functions for displaying large datasets, displaying circular data in a very flexible way, finding local maxima, brewing color ramps, drawing nice arrows, zooming 2D-plots, creating figures with differently colored margin and plot region. In addition, the package contains auxiliary functions for data manipulation like omitting observations with irregular values or selecting data by logical vectors, which include NAs. Other functions are especially useful in spectroscopy and analyses of environmental data: robust baseline fitting, finding peaks in spectra, converting humidity measures.

License GPL (>= 3)

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Description

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Author(s)

Rene Locher, Andreas Ruckstuhl et al. Maintainer: Christoph Hofer <christoph.hofer@zhaw.ch>

Arrows	*Pretty Open or Closed Arrows*

Description

Draws a set of open or closed arrows which can be shaped by many arguments. `Arrows` is an extended version of `p.arrows`.

Usage

```
Arrows(x1, y1, x2, y2, size = 1, width = 1.2/4/cin, open = TRUE,
        sh.adj = 0.1, sh.lwd = 1, sh.col = par("fg"),
        sh.lty = 1,
        h.col = sh.col, h.col.bo = sh.col, h.lwd = sh.lwd, h.lty = sh.lty,
        verbose = FALSE)
```

Arguments

x1, y1	Coordinates of points **from** which to draw.
x2, y2	Coordinates of points **to** which to draw.
size	Head size as a fraction of a character height.
width	Width of the arrow head. See argument verbose.
open	Defines if arrows are open or closed.
sh.adj	Defines gap between end of the shaft and the top of the head of the arrow (see details)
sh.lwd	Thickness of shaft. cf. par
sh.col	Color of shaft. cf. par
sh.lty	Line type of shaft. cf. par
h.col	Color of head.
h.col.bo	Color of border of head.
h.lwd	Line width of border of head.
h.lty	Line type of border of head.
verbose	When TRUE, the width used is returned.

Details

Definition of sh.adj:

=0 End of shaft at top of head,

=1 End of shaft at bottom of head,

>1 Gap between shaft and head,

<0 Head is on the shaft.
  This function is based on **graphics**

Value

A value is only returned, when verbose == TRUE.

Note

The plotting device should not be resized manually after plotting as this changes in general the aspect ratio of the plot and deforms hereby the plotted arrows. The beauty of the arrows depends from the resolution of the device. The higher resolutions give better results.

Author(s)

Andreas Ruckstuhl, refined by Rene Locher

See Also

p.arrows, arrows

Examples

```
## a bunch of different arrows
plot(c(0,10), c(0,10), type="n")
Arrows(5, 5, 5,10, size=3,
       sh.lwd=5, sh.lty=2,
       h.lwd=5)
Arrows(5, 5, 7.5, 9, size=3, open=TRUE,
       sh.adj=0.7, sh.lwd=5, sh.lty=2,
       h.col.bo="red",h.lwd=5)
Arrows(5, 5, 9, 7.5, size=3, open=FALSE,
       sh.adj=1, sh.lwd=5, sh.col="blue",
       h.col.bo="red",h.lwd=2)
Arrows(5, 5, 10, 5, size=2.5, width=1.5, open=FALSE,
       sh.adj=1, sh.lwd=7, sh.col="blue")
Arrows(5, 5, 9, 2.5, size=4, open=FALSE,
       sh.lty=0,
       h.col.bo="black",h.lwd=5)
Arrows(5, 5, 7.5, 1)
Arrows(5, 5, 5, 0, size=2)
Arrows(5, 5, 2.5, 1, size=2, width=1)

## vector field
x<- runif( 20)
y<- runif( 20)
u<- 0.1+0.02*rnorm(20)
v<- 0.1+0.02*rnorm(20)
plot(x,y,xlim=range(c(x,x+u)),ylim=range(c(y,y+v)),type="n")
Arrows(x,y,x+u,y+v,sh.col="blue")
```

---

cart2clock	*Convert Cartesian Coordinates to Clock Coordinates*

Description

Converts cartesian coordinates (x, y to clock coordinates (rho, phi)

Usage

```
cart2clock(x, y, circle)
```

Arguments

x, y	Cartesian coordinates.
circle	Defines the full circle in the units of phi.

Details

Be aware that in clock coordinates and polar coordinate the angle phi is differently defined!

Value

Data frame with

rho	Distance of point from center of coordinate system.
phi	Angle between North (12 o' clock), center and the point, measured clockwise.

Author(s)

Rene Locher

See Also

clock2cart, rose-class

Examples

```
## convert clock coordinates to cartesian coordinates
xy <- clock2cart(rho=rep(1,33),phi=seq(0,to=360,length.out=33),circle=360)

## convert the cartesian coordinates back to clock coordinates
rhophi <- cart2clock(xy$x,xy$y,circle=360)

round(clock2cart(rhophi,circle=360)-xy)
## QED
```

clock2cart	*Convert Clock Coordinates to Cartesian Coordinates*

Description

Converts clock coordinates (rho, phi) to cartesian coordinates (x, y).

Usage

```
clock2cart(rho, phi, circle)
```

Arguments

rho	Distance of point from center of coordinate system.
phi	Angle between North (12 o' clock), center and the point, measured clockwise.
circle	Defines the full circle in the units of phi.

Details

Be aware that in clock coordinates and polar coordinate the angle phi is differently defined!

Value

Data frame with

x, y	Cartesian coordinates.

Author(s)

Rene Locher

See Also

[cart2clock](#), [rose-class](#)

Examples

```
## an easy way to plot a circle
xy <- clock2cart(rho=rep(1,33),phi=seq(0,to=360,length.out=33),circle=360)
plot(xy)
```

---

col2hsv   *Convert Color to hsv Code*

Description

Converts color names or values to hsv code.

Usage

```
col2hsv(col)
```

Arguments

col   Vector of color code.

Value

Matrix with the rows

h   Hue of hsv-Signal: 0=red, 1/3=green, 2/3=blue, 1=red.

s   Saturation of hsv-Signal: 0=white, 1=full color.

v   Value of hsv-Signal: 0=black, 1=full color.

Author(s)

Rene Locher

See Also

[col2rgb](), [rgb2hsv](), [hsv]()

Examples

```
col2hsv(c("blue","green","red"))
```

---

data.sheet	*Coerce a list to a data.frame*

Description

Coerces a list with vectors of different length into a data.frame. Fills the shorter vectors with NA.

Usage

```
data.sheet(x)
```

Arguments

x	List to be converted.

Details

This function is convenient for comparing / controling data in Lists whose components should have approximately the same length.

Value

data.frame

Author(s)

Thomas Unternaehrer

Examples

```
data.sheet(list(a=1:5,b=1:4))
```

---

draw.leg	*Produce a Legend or Key (Grid Function)*

Description

Produces (and possibly draws) a Grid frame grob which is a legend that can be placed in other Grid plots. draw.leg is a slightly enhanced version of draw.key in package **lattice** V 0.12-3.

Usage

```
draw.leg(key, draw=FALSE, vp=NULL)
```

Arguments

key	A list determining the key. See details below and the documentation for xyplot.
draw	logical, whether the grob is to be drawn.
vp	viewport

Details

Three new components are added to the list key of the original code in package **lattice** V 0.12-3: between.rows, between.title, adj.title. They allow to format the legend in a more flexible way. To ease the use of draw.leg, the full description of draw.key and the here interesting part of xyplot are also included:

The key essentially consists of a number of columns, possibly divided into blocks, each containing some rows. The contents of the key are determined by (possibly repeated) components named "rectangles", "lines", "points" or "text". Each of these must be lists with relevant graphical parameters (see later) controlling their appearance. The key list itself can contain graphical parameters, these would be used if relevant graphical components are omitted from the other components.

The length (number of rows) of each such column (except "text"'s) is taken to be the largest of the lengths of the graphical components, including the ones specified outside (see the entry for rep below for details on this). The "text" component has to have a character or expression vector as its first component, and the length of this vector determines the number of rows.

The graphical components that can be included in key (and also in the components named "text", "lines", "points" and "rectangles" as appropriate) are:

- cex=1
- col="black"
- lty=1
- lwd=1
- font=1
- fontface
- fontfamily
- pch=8
- adj=0
- type="l"
- size=5
- angle=0
- density=-1

adj, angle and density are currently unimplemented. size determines the width of columns of rectangles and lines in character widths. type is relevant for lines; "l" denotes a line, "p" denotes a point, and "b" and "o" both denote both together.

Other possible components of key are:

between numeric vector giving the amount of space (character widths) surrounding each column (split equally on both sides),

title string or expression giving a title for the key

rep logical, defaults to `TRUE`. By default, it's assumed that all columns in the key (except the "text"s) will have the same number of rows, and all components are replicated to be as long as the longest. This can be suppressed by specifying `rep=FALSE`, in which case the length of each column will be determined by components of that column alone.

cex.title cex for the title

background background color, defaults to default background

border either a color for the border, or a logical. In the latter case, the border color is black if border is `TRUE`, and no border is drawn if it is `FALSE` (the default)

transparent=FALSE logical, whether key area should have a transparent background

columns the number of columns column-blocks the key is to be divided into, which are drawn side by side.

between.columns Space between column blocks, in addition to `between`.

between.rows New argument: Space between rows.

between.title New argument: Space between top row and title of legend.

adj.title New argument: Adjustment of title in respect to body of legend.
    `adj.title = 0` adjusts the title to the left,
    `adj.title = 1` adjusts the title to the right and
    `adj.title = 0.5` (=default) centers the title.

divide Number of point symbols to divide each line when `type` is `"b"` or `"o"` in `lines`.

Value

A Grid frame object (that inherits from "grob")

Author(s)

Deepayan Sarkar, modified by Rene Locher

See Also

[xyplot](#)

Examples

```
require(grid)

## Legend 2 cm below and 1 cm left of the upper right corner
grid.newpage()
key <- draw.leg(key =
                    list(rectangles = list(col=1:3,
                            size = 2,
                            lwd = 0.5),
                        text = list(LETTERS[1:3]),
                        cex = 1.2,
                        between = 2,
                        between.rows = 0.5,
```

```
                                    between.title = 0.7,
                                    title = "component",
                                    cex.title = 1.4,
                                    transparent = TRUE))

   vp.key <-  viewport(x = convertX(unit(1,"npc")-unit(1,"cm"),"cm"),
                       y = convertY(unit(1,"npc")-unit(2,"cm"),"cm"),
                       width=grobWidth(key),
                       height=grobHeight(key),
                       just=c("right","top"))

   pushViewport(vp.key)
   grid.draw(key)
   popViewport()

   ##--------------------------------------
   ## Legend 1 cm above the lower left corner
   key <- draw.leg(key = list(rectangles = list(col=1:3,
                                     size = 4,
                                     lwd = 0.5),
                       text=list(letters[1:3]),
                       lines=list(col=1:3),
                       cex=2,
                       between=2,
                       between.rows=0.5,
                       between.title=0.7,
                       title = "component",
                       adj.title = 0,
                       cex.title = 2.4,
                       transparent = TRUE))

   vp.key <-  viewport(x = 0,
                       y = unit(1,"cm"),
                       width=grobWidth(key),
                       height=grobHeight(key),
                       just=c("left","bottom"))

   grid.newpage()
   pushViewport(vp.key)
   grid.draw(key)
   popViewport()
```

---

general.control   *Auxilary for Controlling the General Appearance of a Rose Plot*

Description

Defines the General Appearance of rose plot.

Usage

```
general.control(stacked = FALSE,
                rose.rad = NULL, rose.x = NULL, rose.y = NULL,
                mar = rep(0.3, 4),
                rev.col = FALSE,
                shift = 0,
                cex = 1, col = NULL, lty = 1:3, lwd = 1, type = "s")
```

Arguments

stacked   stacked = FALSE: For each point (object@rho[i,j], object@cyclVar[i])
                 with x equal to a [rose](#) object, the radius is object@rho[i,j] - ray.lim[1] as
                 defined in [grid.control](#). Points with identical j are connected by a colored
                 line.
                 stacked = TRUE: For each point (object@rho[i,j], object@cyclVar[i]),
                 the radius is sum(object@rho[1:i,j]). No negative values are allowed in
                 the stacked case as this feature makes sense only for variables like proportions,
                 counts or concentrations. Areas between two adjacent j are filled by color.
                 NA values in object@rho are interpreted as 0 and a warning is issued.

rose.rad, rose.x, rose.y
                 Approximate length of radius, x- and y-position of rose. Default units are mm
                 but any valid grid unit might be chosen (cf. [unit](#). If one or more of these
                 arguments are defined, the user of the plot function must make sure that the size
                 of the viewport is large enough to show the complete rose and the legend. These
                 arguments are especially useful when a series of plots of exactly the same size
                 and position of the rose on the viewport has to be produced.

mar   Margin around the plotting area. Default units are grid.control(cyclVar.cex).
                 Other units can be defined by [unit](#).

rev.col   = TRUE: Ordering of the columns of object@rho is reversed.

shift   Shifts the plot in clockwise direction by this angle. Units of shift must be
                 identical with units of cyclVar in link{plot.rose}

cex   Basic size of characters in the plot.

col   Colors of lines when stacked = FALSE or colors of stacked areas else. In the
                 first case colors are by default as distinct as possible; in the latter case, all colors
                 are matched by default to the range green (=center of rose) to blue (outside of
                 rose).

lty, lwd   Line type and line width. When stacked = TRUE and lwd = 0 the colored aereas
                 are drawn without black borders.

type   1-character string giving the type of plot desired:
                 "s" plots observations as segments. This option is the proper way to distplay
                 rose data.
                 "l" plots a line joining the data points. This option is a nicer to look at when data
                 are smoothly distributed in all directions.

Value

Returns the arguments conveniently packaged up in a list to supply the general arguments for `plot.rose`.

Author(s)

Rene Locher

See Also

`plot.rose`, `grid.control`

Examples

```
general.control()
```

---

getXY   *Easy and Flexible Input for One- and Two Dimensional Data*

Description

The function accepts one- or two dimensional data, checks them for compatibility and gives a dataframe back.

Usage

```
getXY(x, y = NULL, unidim.allowed = TRUE)
```

Arguments

x	Vector, matrix, dataframe or list. If x is a vector, the second dimension may be defined by argument y. If x is a matrix, dataframe or list and a second column or element exists, this second element is used instead of y.
y	Optional vector of the same length as x. When argument x is onedimensional, argument y does not exist *and* unidim.allowed is TRUE, argument x is coerced to a vector and returned as y component where the resulting x is just the index vector 1:n.
unidim.allowed	Logical. When unidim.allowed is TRUE (=default), one and two dimensional input is accepted for any reasonable combination of x and y. In this mode `getXY` behaves very similar to `xy.coords` An error message is returned, when `unidim.allowed` is FALSE, argument x is onedimenional und y does not exist.

Details

Input is checked for compatibility: When x is a list, the first two elements must have identical length. When y is defined, x must be one dimensional and must have the same length as argument y. When onedim.allowed is FALSE, input must be twodimensional.

When input is one dimensional and unidim is TRUE, y gives the numbers of elements back.

Function works similar to `xy.coords`

Value

dataframe with the components x and y

Author(s)

Rene Locher

Examples

```
getXY(3:4, 1:2)
getXY(matrix(1:4,ncol=2))
getXY(as.data.frame(matrix(1:4,ncol=2)))
getXY(4:1)
getXY(list(a=1:2,b=9:10))
```

---

grid.control   *Auxilary for Controlling the Grid Appearance of a Rose Plot*

Description

Defines the appearance of the guiding elements of rose plots such as circles, rays and labels.

Usage

```
grid.control(circ.n = 4, circ.r = NULL,
             circ.col = "gray30", circ.lwd = 0.5,
             circ.cex = 0.8, circ.between = 0.3,
             circ.dir = pi/16 * 9,
             circ.sub.n = NULL, circ.sub.r = NULL,
             circ.sub.col = "gray70", circ.sub.lwd = 0.5,
             cyclVar.lab = c("N","NE","E","SE","S","SW","W","NW"),
             cyclVar.cex = 1.2, cyclVar.between = 0,
             cyclVar.centered = TRUE,
             ray.lim = NULL, ray.n = 8)
```

Arguments

`circ.n, circ.r`	Number of (main)circles or, alternatively, radius of circles to be drawn, which will be labeled.
`circ.col, circ.lwd`	
	Color and line width of circles.
`circ.cex`	Character size of labels of main circles in multiples of cex as defined in `general.control`.
`circ.between`	Distance between labels of the main circle and the circle itself in multiples of circ.cex.
`circ.dir`	Direction along which the labels of the main circles should be drawn, measured clockwise as radian from North.
`circ.sub.n, circ.sub.r`	
	Number of subcircle intervals between two main circles, or, alternatively, the radii of *all* subcircles.
`circ.sub.col, circ.sub.lwd`	
	Color and line width of subcircles.
`cyclVar.lab`	Labels of cyclic variable placed along the outmost circle.
`cyclVar.cex`	Charactersize of labels of cyclic variable in multiples of cex as defined in `general.control`
`cyclVar.between`	
	Distance between labels of the cyclic variable and the outmost circle of the rose in multiples of cyclVar.cex.
`cyclVar.centered`	
	Labels are positioned relative to their center. cyclVar.centered = FALSE is used for very long labels like (unabbreviated) days of the week. In this case, the labels are positioned relative to the side of the label, which is closest to the circle.
`ray.lim`	Defines the values for the center and the maximum radius in user coordinates. Be careful with specifying the center different from 0 as this might result in misleading roses.
`ray.n`	Number of rays.

Value

Returns the arguments conveniently packaged up in a list to supply the arguments for the grid appearance of rose plot.

Author(s)

Rene Locher

See Also

`plot.rose`, `general.control`

Examples

```
grid.control()
```

---

humidity   *Converting Humidity Measures into Each Other*

Description

Converting dew point (of water in air) into vapor pressure or relative humidity and vice versa.

Usage

```
hr(T, Td, warn = TRUE)
pw(Td, warn = TRUE)
pw.ai(Td, warn = TRUE)
pw.aw(Td, warn = TRUE)
Td(pw = NULL, T = NULL, hr = NULL, warn = TRUE)
Td.aw(pw = NULL, T = NULL, hr = NULL, warn = TRUE)
Tf.ai(pw = NULL, T = NULL, hr = NULL, warn = TRUE)
```

Arguments

hr	Relative humidity in $[\%]$.
T	Temperature of air in $[°C]$.
Td	Dew point of air in $[°C]$.
pw	Saturation vapour pressure in $[hPa]$.
warn	When TRUE and arguments are out of range, a warning is thrown.

Details

All vapour pressures correspond to pure water vapour and are not adjusted to water vapour in air.

Value

hr transforms dew point above ice / water at a certain temperature into relative humidity ($-65°C <= T <= 60°C$).
pw transforms dew point into saturation vapour pressure above ice ($-65°C <= T <= 0°C$) and above water ($0°C < T <= 60°C$) respectively.
pw.ai transforms dew point into saturation vapour pressure above ice ($-65°C <= T <= 0°C$).
pw.aw transforms dew point into saturation vapour pressure above liquid water ($-45°C <= T <= 60°C$).
Td transforms vapour pressure or relative humidity and temperature into frost point above ice ($-65°C <= T <= 0°C$) and dew point above water ($0°C < T <= 60°C$) respectively.
Td.aw transforms vapour pressure or relative humidity and temperature into dew point above water ($-45°C <= T <= 60°C$).
Tf.ai transforms vapour pressure or relative humidity and temperature into frost point above ice ($-65°C <= T <= 0°C$).

Author(s)

Rene Locher

References

Guide to Meteorological Instruments and Methods of Observation, WMO, WMO-No. 8, Seventh edition, 2008, updated 2010, 1.4-29 Annex 4.B

Examples

```
pw(Td = c(-65, -45, 0, 30, 60))
Td(pw = pw(c(-20, 0, 20)))

hr(T = c(20, 30, 40), Td = c(0, 20, 30))
## [1] 26.20257 55.09561 57.46519

hr(T = seq(0, 60, 5), Td = 0)
```

IDPcolorRamp   *Color Ramp for Ordered Values*

Description

Produces color ramps which change simultanously hues, saturation and values as defined in the [hsv](#) modus. This allows to produce especially smooth transitions from one color to the next. The default color ramp starts with light blue, continues with green, yellow, red and ends with dark violet.

Usage

```
IDPcolorRamp(n,
             colInt = data.frame(h = c(0.47, 0.28, 0.16, 0, 1, 0.8),
                                 s = c(0.31, 0.55, 0.7, 0.8, 0.8, 1),
                                 v = c(1, 1, 1, 1, 1, 0.4)),
             fr = c(0.27, 0.27, 0.27, 0))
```

Arguments

n	Total number of different colors in color ramp.
colInt	Data.frame or matrix with the columns h,s & v which defines the Intervals for individual color subramps, with nrow(colInt) = nsr+1 with nsr>1. See details
fr	Fraction of the colors in each of the first nsr-1 subramps.

Details

The function distributes the number of colors in the subramps, given the fractions fr, as smoothly as possible. The default arguments are optimized to most distinct colors possible, also for very small n. There is at least one color in the first and the last subramp.
Definition of hsv code:

h Hue of hsv-Signal: 0=red, 1/3=green, 2/3=blue, 1=red.

s Saturation of hsv-Signal: 0=white, 1=full color.

v Value of hsv-Signal: 0=black, 1=full color.

Value

A vector of n colors.

Note

If there are subramps which are not adjacent in the color space (as is here the case for red and violet), you need a virtual subramp (here from h=0.00 to h=1.00) with corresponding fraction fr == 0.

Author(s)

Rene Locher

See Also

showColors, ColorBrewer

Examples

```
IDPcolorRamp(10)

## Default IDPcolorRamp in 21 colors
n <- 21
showColors(IDPcolorRamp(n),border=FALSE)

## colorRamp optimized to return at equidistant indices the colors
## light blue, light green, yellow, orange, red, dark violet
## works fine with n > 7
cInt <- data.frame(h = c(0.47, 0.28, 0.16, 0, 1, 0.8),
                   s = c(0.31, 0.55, 0.7, 0.8, 0.8, 1),
                   v = c(1, 1, 1, 1, 1, 0.5))

fr <- c(0.15, 0.25, 0.45, 0.0)
ii <- seq(1,n,length.out=6)

## colors at equidistant indices
showColors(IDPcolorRamp(n, colInt = cInt, fr =fr)[ii], border=FALSE)

## Alternative ramp in 21 colors
showColors(IDPcolorRamp(n, colInt = cInt, fr =fr), border=FALSE)
```

---

ilagplot   *Image Lag Plot Matrix for Large Time Series*

Description

Produces an image lag plot matrix of large timeseries where the colors encode the density of the
points in the lag plots.

Usage

```
ilagplot(x, set.lags = 1,
        pixs = 1, zmax = NULL, ztransf = function(x){x},
        colramp = IDPcolorRamp, mfrow=NULL, cex=par("cex"),
        main = NULL, d.main = 1, cex.main = 1.5*par("cex.main"),
        legend = TRUE, d.legend = 1,
        cex.axis = par("cex.axis"), las = 1,
        border=FALSE, mar = c(2,2,2,0), oma = rep(0,4)+0.1,
        mgp = c(2,0.5,0)*cex.axis, tcl = -0.3, ...)
```

Arguments

x	ts object or ordinary vector
set.lags	vector of lags to be displayed
pixs	Pixel size in mm
zmax	Maximum counts per Pixel to be plotted. When NULL each lag plot has its individual scale. If a number >= maximum number of counts per pixel is supplied, the scale will be identical for all lag plots. The maximum of the number per pixel is delivered by the return value. Beware: zmax has its meaning only for ilagplots with identical settings for main, legend, mar and oma!
ztransf	Function to transform the counts. The user has to make sure that the transformed counts lie in the range [0,zmax], where zmax is any positive number (>=2).
colramp	Color ramp to encode the density of the points within a pixel
mfrow	See Argument mfrow in [par](par)
cex	See Argument cex in [par](par)
main	Title
d.main	Vertical distance between upper border of scatter plots and the title line in multiples of title height.
cex.main	Magnification used for title relative to the current setting of cex.
legend	Logical. When FALSE, no legend is plotted and space is saved in figure region.
d.legend	Horizontal distance between right border of scatter plots and legend in multiples of title height.
cex.axis	Magnification used for axis annotation relative to the current setting of cex.
las	Orientation of labels on axes.

border	Logical. When TRUE, a border is drawn around the individual colors in the legend.
mar, oma	Margin and outer margin respectively. Cf. par
mgp, tcl	Cf. par
...	Additional arguments to par

Details

Code is based on R function lag.plot V1.7. Tip: Legend looks better when mar is defined symmetrically.

Value

Maximum number of counts per Pixel found.

Note

When you get the error message "Zmax too small! Densiest aereas are out of range!" you must run the function with identical parameters but without specifying zmax. The value returned gives you the minimum value allowed for zmax.

Author(s)

Andreas Ruckstuhl, refined by Rene Locher

See Also

ipairs, iplot, Image

Examples

```
if(require(SwissAir)) {
  data(AirQual)

  ilagplot(AirQual[,c("ad.O3")],set.lags = 1:4,
          ztransf = function(x){x[x<1] <- 1; log2(x)},
          main = "Low correlation")

  Ox <- AirQual[,c("ad.O3","lu.O3","sz.O3")]+
    AirQual[,c("ad.NOx","lu.NOx","sz.NOx")]-
      AirQual[,c("ad.NO","lu.NO","sz.NO")]
  names(Ox) <- c("ad","lu","sz")
  ilagplot(Ox$ad,set.lags = 1:4,
          ztransf = function(x){x[x<1] <- 1; log2(x)},
          main = "High correlation")

  ## cf. ?AirQual for the explanation of the physical
  ## and chemical background
} else print("Package SwissAir is not available")
```

Image   *Display the Density of Points in a Scatter Plot by Colors*

Description

The density of points in a scatter plot is encoded by color.

Usage

```
Image(x, y = NULL, pixs = 1, zmax = NULL, ztransf = function(x){x},
      colramp = IDPcolorRamp, factors = c(FALSE, FALSE),
      matrix = FALSE)
```

Arguments

x, y	Coordinates of points whose density is plotted. If x is a matrix or a data.frame, the first two column are used as x and y respectively. y must be in this case NULL. x and y may be numeric or factor variable.
pixs	Size of pixel in x- and y-direction in [mm] on the plotting device. When x and y are numeric, pixels are square. When x and y are factors or should be handled as factors (see argument factors), pixels are no longer square. The pixels are enlarged in the dimension in which the factors are displayed, so that the rectangular pixels are centered at the factor levels.
zmax	Maximum number of counts per pixel in the plot. When NULL, the density in the scatter plot is encoded from 0 to maximum number of counts per pixel observed. zmax must be equal or larger than maximum number of counts found. The maximum number of counts per pixel is delivered by the return value.
ztransf	Function to transform the number of counts per pixel, which will be mapped by the function in colramp to well defined colors. The user has to make sure that the transformed density lies in the range [0,zmax], where zmax is any positive number (>=2). For examples see [ipairs](#) and [ilagplot](#).
colramp	Color ramp to encode the number of the counts within a pixel by color.
factors	Vector of logicals indicating whether x and / or y should be handled as factors independently of their class.
matrix	Boolean. Should all counts be returned in a xyz-matrix or just the maximum.

Details

Before calling Image a plot must have been created by, e.g., calling plot(x,y,type="n"). This function ensures by default that the pixel has the same size in x- and y-direction. As a drawback, pixels may be unequally spaced, when there are only very few distinct (integer) values in x- or y-direction. When this is the case, the corresponding dimension should be declared as a factor. (cf. argument factors).

This function is based on **[graphics](#)**

Value

Maximum number of counts per pixel found (`matrix = FALSE`) or the full matrix.

Author(s)

Andreas Ruckstuhl, Rene Locher

See Also

[ipairs](#), [ilagplot](#), [iplot](#), [image](#)

Examples

```
plot.default(iris$Species, iris$Petal.Width, xlim=c(0.5,3.5),
             type="n", axes=FALSE)
axis(1, at=1:3, labels=levels(iris$Species))
axis(2)
Image(iris$Species, iris$Petal.Width, pixs=3)

##
x <- rnorm(10000)
y <- rnorm(10000, 10)
plot(x+y, y, type="n")
Image(x+y, y)
abline(a=0, b=1)

## The above can be merged to
iplot(x+y, y, legend=FALSE, oma=c(5, 4, 4, 2) + 0.1)
abline(a=0, b=1)
```

---

ipairs   *Image Scatter Plot Matrix for Large Datasets*

Description

Produces an image scatter plot matrix of large datasets where the colors encode the density of the points in the scatter plots.

Usage

```
ipairs(x,
       pixs = 1, zmax = NULL, ztransf=function(x){x},
       colramp = IDPcolorRamp, cex = par("cex"),
       lab.diag, cex.diag = NULL,
       main = NULL, d.main = 1.5, cex.main = 1.5*par("cex.main"),
       legend = TRUE, d.legend = 1.5, cex.axis = 0.8*par("cex.axis"),
       nlab.axis = 5, minL.axis = 2, las = 1, border = FALSE,
       mar = rep(0,4), oma = c(3,3,1,0), mgp = c(2,0.5,0)*cex.axis,
       tcl = -0.3, ...)
```

Arguments

x	data.frame or matrix
pixs	Pixel size in mm on the plotting device.
zmax	Maximum number of counts per pixel in the plot. When NULL, each scatter plot has its individual scale. If a number >= maximum number of counts per pixel is supplied, the scale will be identical for all scatter plots. The maximum number of counts per pixel is delivered by the return value.
ztransf	Function to transform the counts per pixel, which will be mapped by the function in colramp to well defined colors. The user has to make sure that the transformed counts lie in the range [0,zmax], where zmax is any positive number (>=2).
colramp	Color ramp to encode the number of counts within a pixel.
cex	See Argument cex in [par](#)
lab.diag	Labels of columns, written into the diagonal of the matrix. When NULL, the names of x are used.
cex.diag	Magnification used for text in diagonal relative to the current setting of cex. When NULL, they are calculated automatically.
main	Titel. When NULL
d.main	Vertical distance between upper border of scatter plots and the title line in multiples of title height.
cex.main	Magnification used for title relative to the current setting of cex.
legend	Logical. When FALSE, no legend is plotted and space is saved in figure region.
d.legend	Horizontal distance between right border of scatter plots and legend in multiples of title height.
cex.axis	Magnification used for axis annotation relative to the current setting of cex.
nlab.axis	Approximate number of labels on axes.
minL.axis	The minimum length of the abbreviations of factor levels, used to label the axes ticks.
las	Orientation of labels on axes.
border	Logical. When TRUE, a border is drawn around the individual colors in the legend.
mar, oma	Margin and outer margin respectively. Cf. [par](#)
mgp, tcl	Cf. [par](#)
...	Additional arguments to [par](#)

Details

The idea is similar to [gplot.hexbin](#). The hexagons are better suited to reflect the density of points in a plane than the squares used here. Nevertheless squares are, contrary to hexagons, invariant to reflexions at the x- *and* y-axis and therefore better suited for scatter plot matrices and also for plotting factors.

The code is based on R function [pairs](#) V1.7.

Value

Maximum number of counts per Pixel found. Additional elements are returned when `verbose ==`
`TRUE`.

Note

When you get the error message "Zmax too small! Densiest aereas are out of range!" you must run
the function with identical parameters but without specifying zmax. The value returned gives you
the minimum value allowed for zmax.

Author(s)

Andreas Ruckstuhl, Rene Locher

See Also

[ilagplot](), [iplot](), [Image]()

Examples

```
## Small numbers of different values are plotted nicer
## when converted to factors
AQ <- airquality
AQ$Month <- as.factor(AQ$Month)

zmax <- ipairs(AQ, pixs=2, main="Air Quality")
ipairs(AQ, pixs=2, zmax=zmax, main="Air Quality",border=TRUE)

## example with factors
ipairs(iris,pixs=2)

## a really huge dataset
## Not run:
  if(require(SwissAir)) {
    data(AirQual)

    ## low correlation
    dev.new()
    ipairs(AirQual[,c("ad.O3","lu.O3","sz.O3")],
    ztransf=function(x){x[x<1] <- 1; log2(x)})

    dev.new()
    ipairs(AirQual[,c("ad.NO","lu.NO","sz.NO")],
    ztransf=function(x){x[x<1] <- 1; log2(x)})

    ## high correlation
    Ox <- AirQual[,c("ad.O3","lu.O3","sz.O3")]+
    AirQual[,c("ad.NOx","lu.NOx","sz.NOx")]-
    AirQual[,c("ad.NO","lu.NO","sz.NO")]
    names(Ox) <- c("ad","lu","sz")
    dev.new()
```

```
    ipairs(Ox, ztransf=function(x){x[x<1] <- 1; log2(x)})

    ## cf. ?AirQual for the explanation of the physical and
    ## chemical background
  } else print("Package SwissAir is not available")

## End(Not run)
```

---

ipanel.smooth   *Panelplot for itermplot*

Description

An example of a useful panel function for huge datasets

Usage

```
ipanel.smooth(x, y = NULL, pixs = 1, zmax = NULL,
              ztransf = function(x) {x},
              colramp = IDPcolorRamp, col = "black", lwd = 2,
              span = 2/3, iter = 3, ...)
```

Arguments

x, y	Numeric vectors of the same length.
pixs	Size of pixel in x- and y-direction in [mm] on the plotting device. When x and y are numeric, pixels are square. When x and y are factors, pixels are no longer square. The pixels are enlarged in x-direction.
zmax	Maximum number of counts per Pixel in the plot. When NULL, the density in the scatter plot is encoded from 0 pixel to maximum number of counts observed. zmax must be equal or larger than maximum number of counts found.
ztransf	Function to transform the number of counts per pixel, which will be mapped by the function in colramp to well defined colors. The user has to make sure that the transformed density lies in the range [0,zmax], where zmax is any positive number (>=2). For examples see ipairs and ilagplot.
colramp	Color ramp to encode the number of counts within a pixel by color.
col, lwd	Color and line width of the "smoothed curve".
span	the smoother span. This gives the proportion of points in the plot which influence the smooth at each value. Larger values give more smoothness.
iter	The number of robustifying iterations which should be performed. Using smaller values of iter will make lowess run faster.
...	Other graphical parameters as arguments to the lines function.

Author(s)

Rene Locher

See Also

lowess

Examples

```
r.lm <- lm(Sepal.Length~Sepal.Width+Petal.Length+Petal.Width+Species,
           data = iris)
par(mfrow = c(2,2), pty = "s")
itermplot(r.lm, se = TRUE, partial.res = TRUE, smooth = ipanel.smooth,
          lwd.smth = 3, pixs = 2, ask = FALSE)

if (require(SwissAir)) {
  par(mfrow = c(1,1))
  dat <- log(AirQual[,c("ad.O3", "ad.WS")])
  pairs(dat,
        panel = ipanel.smooth)
} else print("Package SwissAir is not available")
```

---

iplot   *Image Scatter Plot for Large Datasets*

Description

Produces an image scatter plot of large datasets where the colors encode the density of the points in
the scatter plot. Works also with factors.

Usage

```
iplot(x, y = NULL,
      pixs = 1, zmax = NULL, ztransf = function(x){x},
      colramp = IDPcolorRamp, cex = par("cex"),
      main = NULL, d.main = 1, cex.main = par("cex.main"),
      xlab = NULL, ylab = NULL, cex.lab = 1,
      legend = TRUE, d.legend = 1,
      cex.axis = par("cex.axis"), nlab.xaxis = 5, nlab.yaxis = 5,
      minL.axis = 3, las = 1, border = FALSE,
      oma = c(5,4,1,0)+0.1, mgp = c(2,0.5,0)*cex.axis, tcl = -0.3, ...
      )
```

Arguments

x, y   Coordinates of points whose density is to be plotted. If x ist a matrix or a
              data.frame, the first two column are used as x and y respectively. y must be
              in this case NULL. x and y may be numeric or factor variable.

pixs   Pixelsize in mm.

zmax	Maximum number of counts per pixel in the plot. When NULL, the density in the scatter plot is encoded from 0 to maximum number of counts per pixel observed. zmax must be equal or larger than maximum number of counts found. The maximum number of counts per pixel is delivered by the return value.
ztransf	Function to transform the number of counts per pixel, which will be mapped by the function in colramp to well defined colors. The user has to make sure that the transformed density lies in the range [0,zmax], where zmax is any positive number (>=2). For examples see ipairs and ilagplot.
colramp	Color ramp to encode the number of counts within a pixel.
cex	Magnification of text relative to default.
main	Title.
d.main	Vertical distance between upper border of scatter plots and the title line in multiples of title height.
cex.main	Magnification used for title relative to the current setting of cex.
xlab	Label for x-axis.
ylab	Label for y-axis.
cex.lab	Magnification used for text in axis labels relative to the current setting of cex
legend	Logical. When FALSE, no legend is plotted and space is saved in figure region.
d.legend	Horizontal distance between right border of scatter plot and legend in multiples of title height.
cex.axis	Magnification used for axis annotation relative to the current setting of cex.
nlab.xaxis, nlab.yaxis	
	Approximate number of labels on x- and y-axes respectively.
minL.axis	The minimum length of the abbreviations of factor levels, used to label the axes ticks.
las	Orientation of labels on axes.
border	Logical. When TRUE, a border is drawn around the individual colors in the legend.
oma	Outer margin. Cf. par
mgp, tcl	Cf. par
...	Additional arguments to par

Details

The idea of this plot is similar to gplot.hexbin. The hexagons are better suited to reflect the density of points in a plane than the squares used here. Nevertheless squares are, contrary to hexagons, invariant to reflexions at the x- *and* y-axis and therefore suited for scatter plot matrices and also for plotting factors.

Value

Maximum number of counts per Pixel found.

Note

When you get the error message "Zmax too small! Densiest aereas are out of range!" you must run the function again without specifying zmax. The value returned gives you the minimum value allowed for zmax.

Author(s)

Andreas Ruckstuhl, Rene Locher

See Also

ilagplot, ipairs, Image

Examples

```
x <-  rnorm(10000)
y <- atan(rnorm(10000, 0))
iplot(x, y)
iplot(x, pixs = 2)

oma <- c(5,5,0,0)
iplot(iris[,1:2], pixs = 4, oma = oma)
iplot(iris[,"Petal.Width"], iris[,"Species"], pixs = 4, oma = oma)
iplot(x = iris[,"Species"], y = iris[,"Petal.Width"], pixs = 10,border = TRUE,
        xlab = "Species",
        ylab = "Petal Width",
        main = "Iris Species and Petal Width", oma = oma)

iplot(iris$Species, iris$Petal.Width,pixs = 3, minL.axis = 10,
      oma = c(3,6,0,0), mgp = c(4, 1, 0),
      cex.axis = 2, cex.lab = 2, cex.main = 2, main = "Larger fonts")
```

---

iplotLegend   *Plots Legend for Color Ramp*

Description

Plots legend for color ramp.

Usage

```
iplotLegend(colramp, ncol = NULL,
            cex.axis = par("cex.axis"), border = FALSE,
            mar = c(0, 0, 0, 3), las = 1, ...)
```

Arguments

colramp	Function defining color ramp, e.g. `IDPcolorRamp`
ncol	Number of individual colors in color ramp. See details.
cex.axis	Magnification to be used for labels.
border	Logical. When TRUE, a border is drawn around the individual colors in the legend.
mar	Margin. See `par`.
las	Orientation of labels on axis. See `par`.
...	Additional arguments to par

Details

A color ramp of ncol+1 individual colors is plotted, starting with the background color (= color 0). When ncol = NULL a color ramp of 101 individual colors is plotted. The color at the bottom is labeled by '0', the color at the top by 'max'.

Author(s)

Rene Locher

Examples

```
## Not run:
par(oma = rep(2, 4))
layout(matrix(c(1, 2), ncol = 2),
       width = c(lcm(par("csi")*5*2.54), 1),
       heights = 1)
## End(Not run)
iplotLegend(IDPcolorRamp, ncol = 15)
```

---

itermplot   *Plot Regression Terms for Huge Datasets*

Description

Plots regression terms against their predictors, optionally with standard errors and partial residuals in a density plot.

Usage

```
itermplot(model, data = NULL, envir = environment(formula(model)),
          partial.resid = FALSE, scale=0, pixs = 1,
          zmax=NULL, ztransf = function(x) {x}, colramp = IDPcolorRamp,
          terms = NULL, se = FALSE,
          xlabs = NULL, ylabs = NULL, main = NULL,
          col.term = "black", lwd.term = 2,
```

```
            col.se = "gray", lty.se = 2, lwd.se = 1,
            col.smth = "darkred", lty.smth = 2,
            lwd.smth = 2, span.smth = 2/3,
            ask = interactive() && nb.fig < n.tms &&
                  .Device != "postscript",
            use.factor.levels = TRUE, smooth = NULL, ...)
```

Arguments

model	Fitted model object
data	Data frame in which variables in model can be found
envir	Environment in which variables in model can be found
partial.resid	Logical; should partial residuals be plotted?
scale	A lower limit for the number of units covered by the limits on the 'y' for each plot. The default is scale = 0, in which case each plot uses the range of the functions being plotted to create their ylim. By setting scale to be the maximum value of diff(ylim) or above for all the plots, then all subsequent plots will be produced in the same vertical units. This is essential for comparing the importance of fitted terms in additive models.
pixs	Size of pixel in x- and y-direction in [mm] on the plotting device. When x and y are numeric, pixels are square. When x and y are factors, pixels are no longer square. The pixels are enlarged in x-direction.
zmax	Maximum number of counts per pixel in the plot. When NULL, each scatter plot has its individual scale. If a number >= maximum number of counts per pixel is supplied, the scale will be identical for all scatter plots. The maximum number of counts per pixel is delivered by the return value.
ztransf	Function to transform the number of counts per pixel. The user has to make sure that the transformed density lies in the range [0,zmax], where zmax is any positive number (>=2). For examples see [ipairs](#) and [ilagplot](#).
colramp	Color ramp to encode the number of counts within a pixel by color.
terms	Numeric. Which terms to plot (default NULL means all terms)
se	Logical. Plot pointwise standard errors?
xlabs	Vector of labels for the x axes
ylabs	Vector of labels for the y axes
main	Logical, or vector of main titles; if TRUE, the model's call is taken as main title, NULL or FALSE mean no titles.
col.term, lwd.term	
	Color and line width for the "term curve"
col.se, lty.se, lwd.se	
	Color, line type and line width for the "twice-standard-error curve" when se = TRUE.
col.smth, lty.smth, lwd.smth	
	Color, line type and line width for the smoothed curve
span.smth	Smoothing parameter f for [lowess](#).

ask	Logical. Should user be asked before each plot? cf. par.
use.factor.levels	
	Logical. Should x-axis ticks use factor levels or numbers for factor terms?
smooth	NULL or a function with the same arguments as ipanel.smooth to draw a smooth through the partial residuals for non-factor terms
...	Other graphical parameters

Details

itermplot is a modified version of termplot of R V2.3.1. Partial residuals are displayed here as a density plot and is therfore especially suited for models of huge datasets. The model object must have a predict method that accepts type=terms, eg glm in the base package, coxph and survreg in the survival package.

For the partial.resid=TRUE option it must have a residuals method that accepts type="partial", which lm, glm and gam do.

The data argument should rarely be needed, but in some cases termplot may be unable to reconstruct the original data frame. Using na.action=na.exclude makes these problems less likely.

Nothing sensible happens for interaction terms.

Value

Maximum number of counts per pixel found.

Author(s)

Rene Locher

See Also

termplot.

Examples

```
r.lm <- lm(Sepal.Length~Sepal.Width+Petal.Length+Petal.Width+Species,
           data=iris)
par(mfrow=c(2,2),pty="s")
itermplot(r.lm, se = TRUE, partial.res=TRUE, lwd.term = 3,
          lwd.se = 2, pixs = 2)

if (require(SwissAir)) {
  data(AirQual)
  r.lm <- lm(log(ad.O3)~log(ad.NOx)+ad.T+ad.Td+ad.WS, data=AirQual)
  par(mfrow=c(2,2),pty="s")
  itermplot(r.lm, se = TRUE, partial.resid=TRUE, smooth=ipanel.smooth,
            lwd.smth = 3, pixs = 1, ask=FALSE)
} else print("Package SwissAir is not available")
```

---

key.control   *Auxilary for Controlling the Appearance of the Legend of a Rose Plot*

Description

Defines the appearance of the legend of a Rose Plot.

Usage

```
key.control(plot = TRUE, lab = NULL, title = NULL, between = 0)
```

Arguments

plot   Defines whether legend should be drawn. When FALSE, the full width of the
               viewport is used for the rose itself.

lab, title   Labels and title of legend. When lab = NULL, labels are extracted from the
               names of the slot x@rho of [rose](#) object.

between   Distance between label East and left edge of legend in cex as defined in [general.control](#)

Value

Returns the arguments conveniently packaged up in a list to supply the arguments for the legend in
[plot.rose](#)

Author(s)

Rene Locher

See Also

[plot](#)

Examples

```
key.control()
```

---

longtsPlot   *Plot Very Long Regular Time Series*

Description

Plot one or more regular time series in multiple figures on one or more pages.

Usage

```
longtsPlot(y1, y2 = NULL,
           names1 = NULL, names2 = NULL,
           startP = start(y1)[1], upf = 400, fpp = 4, overlap = 20,
           x.at = NULL, x.ann = NULL, x.tick = NULL,
           y1.at = NULL, y1.ann = NULL, y1.tick = NULL,
           y2.at = NULL, y2.ann = NULL, y2.tick = NULL,
           nx.ann = 10, ny.ann = 3, cex.ann = par("cex.axis"),
           xlab = "", y1lab = "", y2lab = "", las = 0,
           col.y1 = "black", col.y2 = col.y1,
           cex.lab = par("cex.lab"),
           y1lim = range(y1, na.rm = TRUE, finite=TRUE),
           y2lim = range(y2, na.rm = TRUE, finite=TRUE),
           lty1 = 1, lty2 = 2, lwd1 = 1, lwd2 = lwd1,
           col1 = NULL, col2 = NULL,
           leg = TRUE, y1nam.leg = NULL, y2nam.leg = NULL,
           ncol.leg = NULL, cex.leg = par("cex"),
           h1 = NULL, h2 = NULL, col.h1 = "gray70", col.h2 = "gray70",
           main = NULL, cex.main = par("cex.main"),
           automain = is.null(main),
           mgp = c(2, 0.7, 0), mar = c(2,3,1,3)+.2,
           oma = if (automain|!is.null(main))
                           c(0,0,2,0) else par("oma"),
           xpd = par("xpd"), cex = par("cex"),
           type1 = "s", type2 = type1,
           pch1 = 46, pch2 = pch1, cex.pt1 = 2, cex.pt2 = cex.pt1,
           slide = FALSE, each.fig = 1,
           filename = NULL, extension = NULL, filetype = NULL, ...)
```

Arguments

y1, y2	Regular time series, time series matrices or ordinary vectors, dataframes or matrices with values corresponding to regular time intervals. Corresponding axes are on the left (for y1) and on the right (for y2) respectively. y2 is optional and may have a different frequency and a different start time.
names1, names2	Names for time series used for legend.
startP	Start time of plot.
upf	Number of time units plottet per figure.

fpp	Number of figures per page (screen).
overlap	Length of time series on the right end of the figures which is identical with the left start of the next figure.
x.at	Time points at which long ticks on x-axis and annotations are set.
x.ann	Time annotations (character vector) for long ticks on x-axis
x.tick	Time points at which short ticks are set on x-axis. If Null, no short ticks are set.
y1.at, y1.ann, y1.tick, y2.at, y2.ann, y2.tick	
	Arguments starting with 'y1' ('y2') correspond to arguments for left (right) axis. For details see arguments for x-axis.
nx.ann, ny.ann	Approximate number of annotations on x- and y-axes, respectively
cex.ann	The magnification to be used for axis annotation relative to the current setting of cex.
xlab	Label for x-axis.
y1lab, y2lab	Labels for y-axes on the left and on the right end of the figure.
las	Cf. [par]().
col.y1, col.y2	Colors for left and right axis respectively.
cex.lab	cex of labels.
y1lim, y2lim	Limits for left and right axis respectively.
lty1, lty2	Vector of line types for each time series, possibly recycled.
lwd1, lwd2	Vector of line widths for each time series, possibly recycled.
col1, col2	Vector of color for each time series, possibly recycled.
leg	Logical. When TRUE, legend is drawn.
y1nam.leg, y2nam.leg	
	Name of y1- and y2-axis in legend.
ncol.leg	Number of columns in legend.
cex.leg	cex for legend.
h1, h2	Vector of y-positions of horizontal lines in the coordinate systems represented by the left and the right axis respectively.
col.h1, col.h2	Vector of colors for horizontal lines.
main	Title of plot.
cex.main	cex of title.
automain	Logical. When TRUE, the units of the start and the end on the page are printed in the title.
mgp, mar, oma	Cf. [par]().
xpd	Define whether data points are clipped to the plot region (=FALSE) or not (=TRUE). Horizontal lines, defined by h1 or h2 are always clipped.
cex	Cf. [par]().
type1, type2	For plotting lines or points. Cf. [plot]().
pch1, pch2, cex.pt1, cex.pt2	
	Plotting symbols and there sizes when 'type1' or 'type2' = "p"

slide	Logical. When `FALSE`, the first page (screen) is plotted only. When `TRUE`, user may leaf through the pages interactively.
each.fig	For `each.fig==1` all data are plotted. for `each.fig==2` every 2nd page is plotted and so on.
filename	When `filename` is not `NULL`, the displayed screen(s) are saved to disk and there is no question whether the next page should be printed. When `slide = TRUE`, the filename of the plots is extended by a serial number.
extension	The extension is defined automatically on windows systems and must be defined manually on the other systems.
filetype	*On Windows*: The type of plot, Windows metafile, PNG, JPEG, BMP (Windows bitmap format), TIFF, PostScript or PDF. Defaults to Windows meta file, `"wmf"`, with the extension `".wmf"`. Cf. `savePlot`. *On non Windows operating systems*: A device function (e.g., x11, postscript,...). The filetype defaults to postscript , with the extension `".ps"`. Cf. `dev.print`
...	Additional arguments to `savePlot` and `dev.print` respectively.

Details

For longer time-series, it is sometimes important to spread several time-series plots over several subplots or even over several pages with several subplots in each. Moreover, these series have often different ranges, frequencies and start times. There is sometimes also the need of a more flexible annotation of axes than `plot.ts` provides. `longtsPlot` provides the user with all these features for one or two matrices or regular time series (time series matrices).

Side Effects

One or more pages of time series plots are drawn on the current graphic device and, optionally, saved in one or more files.

Author(s)

Rene Locher

Examples

```
## sunspots, y-axis only on the left
data(sunspots)
longtsPlot(sunspots,upf=ceiling((end(sunspots)-start(sunspots))[1]/5))

## air quality (left axis) and meteo data (right axis)
## use xpd=TRUE for time series with rare but large values
if (require(SwissAir)) {
  data(AirQual)
  st <- 6.5*30*48
  x.at <- seq(st,nrow(AirQual),48)
  longtsPlot(y1=AirQual[,c("ad.O3","ad.NOx")], y2 = AirQual$ad.T,
             names1=c("O3","NOx"),names2 = "Temp",
             startP = st, upf=7*48,
             x.at = x.at, x.ann = substr(AirQual$start,1,6)[x.at],
```

```
                x.tick = seq(st,nrow(AirQual),12),
                y1.at = c(0,100), y1.tick = seq(0,150,50),
                y2.at = c(10,30), y2.tick = seq(10,30,10),
                y1lab="[ppb]", y2lab="[C]",
                y1lim = c(0,100), y2lim = c(10,30), xpd=TRUE,
                col2 = "red", type1 = "l")
}

## Two time series with different frequencies and start times
## on the same figures
set.seed(13)
len <- 4*6*400
x <- sin((1:len)/200*pi)
d <- sin(cumsum(1+ rpois(len, lambda= 2.5)))

y1 <- ts(10*x,start=0,frequency=6)+d*rnorm(len)
y2 <- ts(100*x,start=100,frequency=13)+10*rnorm(len)
longtsPlot(y1,y2)

## plot your own legend
longtsPlot(sunspots, upf = ceiling((end(sunspots)-start(sunspots))[1]/5),
           fpp = 1, leg = FALSE)
legend(1750, 260, legend = "Monthly Sunspot Numbers", col = "blue", lwd = 1,
       bty = "n")
```

MS   *Spectrum Measured by a SELDI TOF Mass Spectrometer*

Description

The spectrum was taken from a sample of sheep blood. The instrument used was a so called SELDI TOF (Surface Enhanced Laser Desorption Ionisation, Time Of Flight) Mass Spectrometer.

Usage

```
data(MS)
```

Format

A data frame with 45213 observations on the following 2 variables.

mz mass / charge

I Intensity

Details

The measured masses lie between m/z=1000 and 200000. The intensities are raw output. Neither smoothing nor background subtraction was applied to the spectrum.

Source

Medical research project.

Examples

```
data(MS)

MS1 <- log10(MS[MS$mz>12000&MS$mz<1e5,])
P <- peaks(MS1, minPH=0.025, minPW=0.0015)

plot(MS1, ty="l", xlim=c(4.15,5))
points(P,col="red")
```

NaRV.omit   *Omit Observations with NA, NaN, Inf and -Inf Values*

Description

Omits observations with values which a not regular (=Not a Regular Value) when object is a vector, a factor, a data.frame or a matrix.

Usage

```
NaRV.omit(x)
```

Arguments

x   Vector, data.frame or matrix

Details

Irregular values are defined as NA, NaN, Inf and -Inf Values in numerics and NA in factors and characters.

Value

Returns objects of class vector, factor, data.frame or matrix in the same way as na.omit does. Returns all other objects unchanged and prints a warning.

Author(s)

Rene Locher

See Also

na.omit

Examples

```
M <- matrix(c(NA,1:7,NA),nrow=3)
M
NaRV.omit(M)

DF <- iris[sample(1:nrow(iris),12),]
DF[1,1] <- NA
DF[10,5] <- NA
row.names(DF) <- 1:12
DF
NaRV.omit(DF)

NaRV.omit(c(NA,1:10,NA))

fac <- factor(c(NA,sample(c(1:9))))
NaRV.omit(fac)

fac <- factor(c(NA,sample(c(1:9))),exclude=NULL)
fac
NaRV.omit(fac)
```

---

ok   *Sets NAs in Logical Objects to FALSE*

Description

Sets NAs in logical vectors and matrices to FALSE. This is especially useful for conditional selections of data when the variables the condition is based on contain NAs.

Usage

```
ok(x)
```

Arguments

x   Logical vector or matrix

Value

Logical vector or matrix, containing no NAs.

Author(s)

Rene Locher

Examples

```
ok(c(FALSE,TRUE,NA,TRUE))
```

---

peaks   *Finding Peaks in Raw Data*

Description

Returns position, signal height and approximate width at half maximum peak height.

Usage

```
peaks(x, y = NULL, minPH, minPW, thr, stepF = 0.49)
```

Arguments

x, y	Position and height of signal. Any reasonable way of defining the coordinates is acceptable. See function link{getXY} for details.
minPH	Mimimum height of peak to be reported.
minPW	Minimum width of peak at half maximum to be reported.
thr	Threshold below which the signal is not processed.
stepF	StepF defines indirectly the accuracy of the selection criteria minPH and minPW and of the value of the calculated width: The smaller the more accurate and the slower the function. It must be <0.5

Details

The function is especially useful for signals in which both very broad and very narrow peaks are of interest. The peaks may lie very close to each other or might even be superpositioned on top of each other, e.g. peaks on broader shoulders. The algorithm is also very useful when the resolution of the signal is poor and the noise is small.

The function is looking for peaks without any preceding baseline substraction or smoothing, which could distort the spectrum.

The selection criteria minPH and minPW and the values for the calculated peak widths are only approximate.

Value

dataframe consisting of

x	Position of peak
y	Signal height
w	Approximate width at half maximum of peak

Note

In the function, the main selection criterium for the peaks is the height of the peaks, the second optional criterium is the width of the peaks.

Author(s)

Rene Locher

Examples

```
n <- 200
freq <- 1:n
theory <- sin(freq/n*4*pi)*cos(freq/n*3*pi)
spec <- theory + 0.1*rnorm(n)

plot(spec,type="b")
lines(theory,lwd=2)

pts <- peaks(spec, minPH=0.7)
points(pts,col="red",cex=1.2, pch=20)

## peaks after smoothing the spectrum
spec.sm <- loess.smooth(freq, spec, span=0.2,
                        degree = 2, evaluation = 100)
lines(spec.sm$x, spec.sm$y, col="steelblue", lwd=2)
pts <- peaks(spec.sm, minPH=0.4)
points(pts,col="green",cex=1.2,pch=20)

## Analyses of Mass Spectrum between 12000 and 100'000
## without smoothing, without baseline substraction
data(MS)
MS1 <- log10(MS[MS$mz>12000&MS$mz<1e5,])

P <- peaks(MS1, minPH=0.02, minPW=0.001)
plot(MS1, type="l", xlab="log10(mz)", ylab="log10(I)")
points(P,col="blue",cex=1.6)
```

---

plot.rose   *Plot Method for Class "rose" (Grid Graphics Function)*

Description

Describes plot method for class "rose"

Usage

```
## S4 method for signature 'rose,missing'
plot(
        x,
        transf = function(x) sqrt(x),
        subset.col = NULL,
        warn = TRUE,
        general = general.control(),
```

```
           grid = grid.control(),
           title = title.control(),
           key = key.control())
```

Arguments

x	Object [rose]().
transf	Transformation function for x@rho. It defaults to the square root, resulting in equal area roses.
subset.col	Display only a subset of the columns of x@rho. Subset might be declared by numerical values or by name.
warn	Logical. If FALSE, warnings are suppressed.
general	Settings for general appearance of plot, defined in [general.control]().
grid	Settings for appearance of guiding elements of rose such as circles, rays and labels, defined in [grid.control]()
title	Settings for title, defined in [title.control]().
key	Settings for appearance of the legend, defined in [key.control]().

Details

This function appeals especially to environmental specialists who often have response variables, which depend from cyclic variables like the direction of wind, the hour of the day, the month etc. All these variables are displayed usually clockwise, starting with 0 in the north (12 o' clock). We call this kind of coordinates 'clock coordinates', to distinct them from the polar coordinates as used in mathematical context. The [rose]() object is displayed as the time on a clock, measuring the angle defined in slot cyclVar in the clockwise direction from the north.

The eye takes the area of a graphical object as a measure of its size. This is why the default transformation of x@rho is chosen to be the square root. For equal distance roses use the transformation function function(x) x.

All labels, titles and line sizes are defined in multiples of cex.

This graphic function is based on package **grid**: Viewport vp.rose which was used to draw the rose and viewport vp.key which was used to draw the key may be addressed by pushviewport() after having drawn the figure.

Value

No value returned

Note

The function is designed to use the area on the active viewport in an optimal way, but the plot is not scalable after having been drawn.

Furthermore this function is still experimental so that some features may change in future versions. You will find another nice example for this plot method in [AirQual]()

Author(s)

Rene Locher

See Also

[rose](), [rose-class]()

Examples

```
hour <- rep(0:23,100)
WD <- c(rnorm(24*90, mean=sample(c(190,220,50),24*90,
                                      replace = TRUE),sd=10),
                   rnorm(24*10, mean=360, sd=180))%%360
dat <- data.frame(A = (2*cos((hour+6)/6*pi)+
                     2*cos((WD+60)/180*pi)+rnorm(24*100,4))^2,
                 B = (2*cos((hour+4)/6*pi)+rnorm(24*100,1,8))^2)
dat$B[dat$B>1000] <- 1000

## two different response variables, scalar summary function
mean.dayrose <- rose(dat[,c("A","B")],
               cyclVar = hour,
               n.cyclVar = 24,
               circle = 24,
               FUN=mean, na.rm=TRUE)

## one response variable, vector summary function
quant.windrose <- rose(dat$A,
                     cyclVar = WD,
                     n.cyclVar = 16, circle = 360,
                     FUN=quantile, na.rm=TRUE)

## one response variable, second (non cyclic) explanatory variable,
## scalar summary function
windrose <- rose(dat[,c("A")],
               cyclVar = WD,
               n.cyclVar=8,
               circle = 360,
               cut = dat$B,
               breaks = c(0,10,100,1000),
               include.lowest = TRUE, dig.lab = 4,
               FUN = function(x) sum(!is.na(x)))

grid::grid.newpage()
plot(mean.dayrose,
    general = general.control(
      mar = rep(1,4),
      stacked = FALSE,
      lwd = 3,
      lty = c(1:2)),
    grid = grid.control(
      circ.n = 2,
      circ.sub.n = 2,
      circ.lwd = 2,
      circ.sub.col = "black",
      ray.n = 12,
      cyclVar.lab = seq(0,by=2,to=22)),
```

```
      title = title.control(text = "unstacked dayrose"),
      key = key.control(title = "Mean",
                         between = 0))

grid::grid.newpage()
plot(quant.windrose)

grid::grid.newpage()
plot(windrose,
     general = general.control(
       stacked = TRUE,
       lwd = 3),
     grid = grid.control(
       circ.n = 2,
       circ.sub.n = 2),
     title = title.control(
       text = "Stacked windrose:\nCounts of A-Values"),
     key = key.control(title = "Value of B"))


if (require(SwissAir)){
  data(AirQual)
  dat <-
    data.frame(month =as.numeric(substr(AirQual$start,4,5)),
               hour = as.numeric(substr(AirQual$start,12,13)),
               WD = AirQual$ad.WD,
               NOx = AirQual$ad.NOx,
               ## NO2 = AirQual$ad.NOx-AirQual$ad.NO,
               ## NO  = AirQual$ad.NO,
               O3  = AirQual$ad.O3,
               Ox  = AirQual$ad.O3+AirQual$ad.NOx-AirQual$ad.NO)


  ## Windrose
  windrose <- rose(dat$WD,
                   cyclVar = dat$WD, n.cyclVar = 32, circle = 360,
                   FUN = function(x) sum(!is.na(x)))

  grid::grid.newpage()
  plot(windrose,
       general =
       general.control(lwd = 2),
       grid =
       grid.control(circ.n = 2,
                    circ.sub.n = 2))

  ## median of concentrations as a function of daytime
  ## from May to September
  med.dayrose <- rose(dat[,c("NOx","O3","Ox")],
                      subset= dat$month>4 & dat$month<10,
                      cyclVar=dat$hour, n.cyclVar=24, circle=24,
                      FUN=median, na.rm=TRUE)
```

```
## line type version of rose
grid::grid.newpage()
plot(med.dayrose,
     general = general.control(lwd=2, type="l"),
     grid =
     grid.control(ray.n = 12,
                  circ.n =2,
                  circ.sub.n = 2,
                  cyclVar.lab = seq(0,by=2,to=22)),
     title = title.control(text =
       "Day Rose of Medians\nduring summer"))

## quantiles of concentrations as a function of daytime
## from May to September
quant.dayrose <- rose(dat$NOx,
                      subset= dat$month>4 & dat$month<10,
                      cyclVar=dat$hour, n.cyclVar=24, circle=24,
                      FUN=quantile, na.rm=TRUE)
grid::grid.newpage()
plot(quant.dayrose,
     general =
     general.control(mar = c(0.3, 0.3, 0.3, 2),
                     lwd = 2),
     grid =
     grid.control(ray.n = 12,
                  cyclVar.lab = seq(0,by=2,to=22)),
     title = title.control(text = "Concentration of NOx [ppb]\nduring summer"),
     key = key.control(title = "Quantiles"))
} else print("Package SwissAir is not available")
```

---

poster.plot   *Convenient xyplot with Differently Colored Margin and Plot Region*

Description

Convenient xyplot with Colored Background. Background of margin may be chosen independently from background in plot region.

Usage

```
poster.plot(x, y = NULL, type = "p",
            col = col.fg, col.axis = col.fg, col.lab = col.fg,
            col.fg = "blue", col.bg = "lavender", col.box = "cornsilk",
            xlim = NULL, ylim = NULL, xlab = "", ylab = "",
            main = "", cex = 1.2, axes = TRUE, ...)
```

Arguments

x	A vector, data.frame or matrix. When x is data.frame or matrix only first two columns are used.
y	A vector or NULL
type	See Argument type in [par](par)
col	Color of points. If length(col) > 1, colors are recycled.
col.axis	Color of axis.
col.lab	Color of labels on axis.
col.fg	Color of foreground.
col.bg	Color of background outside of figure.
col.box	Color of background inside of figure
xlim	Limits of x-axis.
ylim	Limits of y-axis
xlab	Label of x-axis
ylab	Label of y-axis
main	Titel.
cex	Size of characters.
axes	Should axis be plotted?
...	Additional arguments to [par](par).

Details

Side effect: par options will remain changed so that other graphic elements can be added comfortably.

Author(s)

Andreas Ruckstuhl, refined by Rene Locher

Examples

```
poster.plot(iris[,1],iris[,2],
            xlab="Sepal.Length", ylab="Sepal.Width")

poster.plot(iris[,1], col="red", col.box="grey95", ylab="Sepal.Length")

## plotting lines
n <- 200
freq <- 1:n
y <- sin(freq/n*4*pi)*cos(freq/n*3*pi) + 0.1*rnorm(n)
poster.plot(y,col.fg="grey30",type="l")
```

---

rfbaseline   *Robust Fitting of Baselines*

Description

Robust fitting of local regression models for estimating a baseline or a background signal

Usage

```
rfbaseline(x, y, span = 2/3, NoXP = NULL,
           maxit = c(2, 2), b = 3.5, weight = NULL,
           Scale = function(r) median(abs(r))/0.6745,
           delta = NULL, SORT = TRUE, DOT = FALSE, init = NULL)
```

Arguments

x, y	Abscissa and ordinate of the points on the scatterplot.
span	Specifies the amount of smoothing; span is the fraction of points used to compute each fitted value; as span increases the output becomes smoother.
NoXP	Another way of specifying the amount of smoothing; NoXP is the Number of X Points used to compute each fitted value; it must be larger than 3.
maxit	The number of iterations in the robust fit; if maxit=c(0,0), the nonrobust fit is returned; the first entry specifies the number of iterations using an asymmetric biweight function, whereas the second entry specifies the number of iterations using the usual (symmetric) biweight function.
b	Tuning constant in the biweight function.
weight	Optional weights to be given to individual observations.
Scale	function specifying how to calculate the scale of the residuals.
delta	Nonnegative parameter which may be used to save computation. By default, if length(x) <= 100, delta is set equal to 0; if length(x) > 100 set to 1/100th of the range of x.
SORT	Boolean variable indicating whether x data must be sorted. Change it only when the x are sorted and you want to safe computer time.
DOT	If TRUE disregard outliers totally; that is, observations with weight 0 are disregarded even when the neighbourhood is determined.
init	Values of an initial fit.

Value

List containing components

x	Sorted input vector x with duplicate points removed
y	Corresponding input vector y
fit	Fitted values at x
rw	Robust weights of (x,y)-Points used in last iteration of fit
scale	Scale used in last iteration of fit

Author(s)

Andreas Ruckstuhl

References

Ruckstuhl, Andreas F., Matthew P. Jacobson, Robert W. Field and James A. Dodd (2001); Baseline Subtraction Using Robust Local Regression Estimation; Journal of Quantitative Spectroscopy and Radiative Transfer **68**: 179 – 193

Ruckstuhl, Andreas F., et al.; Estimation of background concentrations of atmospheric trace gases using robust local regression; to be published

See Also

See Also as `loess` and `lowess`

Examples

```
data(MS)
MS1 <- log10(MS[MS$mz>12000&MS$mz<1e5,])

MS1.rfb2 <- rfbaseline(x=MS1$mz, y=MS1$I, NoXP=2200, maxit=c(5,0))
plot(x=MS1$mz, y=MS1$I, type="l",
     xlab="log(mass/charge)", ylab="log(intensity)")
lines(MS1.rfb2$x, MS1.rfb2$fit, col="orange", lwd=3)

MS1.rfb3 <- rfbaseline(x=MS1$mz, y=MS1$I, NoXP=1100, maxit=c(5,0),
                       DOT=TRUE, Scale=function(x) mad(x, center=0))
plot(x=MS1$mz, y=MS1$I, type="l",
     xlab="log(mass/charge)", ylab="log(intensity)")
lines(MS1.rfb3$x, MS1.rfb3$fit, col="orange", lwd=3)

## 'delta=0' needs much more computer time
## Not run:
MS1.rfb4 <- rfbaseline(x=MS1$mz, y=MS1$I, NoXP=2200,
                       delta=0, maxit=c(5,0))
plot(x=MS1$mz, y=MS1$I,ty="l",
     xlab="log(mass/charge)", ylab="log(intensity)")
lines(MS1.rfb4$x, MS1.rfb4$fit, col="orange", lwd=3)

## End(Not run)
```

---

rfbaselineScale   *Estimation of the Scale Parameter*

Description

Estimation of the scale parameter based on data smaller than its first mode. Mainly used in rfbaseline.

Usage

```
rfbaselineScale(r)
```

Arguments

r   residuals

Value

Estimated scale.

Author(s)

Andreas Ruckstuhl

See Also

See also [mad](#)

---

rose   *Creates a rose object out of circular data*

Description

rose splits data into subsets according to one or two grouping elements, computes summary statistics for each, and returns the result in a rose object.

Usage

```
rose(x, subset = NULL,
    cyclVar = NULL, circle = NULL, n.cyclVar = 8,
    cut = NULL, labels = NULL,
    breaks = NULL, include.lowest = FALSE, right = TRUE, dig.lab = 2,
    warn = TRUE, FUN = mean, ...)
```

Arguments

x   Vector, data frame or matrix containing the response.

subset   An optional vector specifying a subset of observations to be used in the aggregating process.

cyclVar   Cyclic variable as first grouping element. cyclVar must be a numeric vector whose length is equal to the number of rows in x with 0 <= cyclVar < circle. Observations where cyclic variables are NA are automatically excluded from the rose object.

circle   Defines the value of a full circle with no default.

n.cyclVar	Defines the number of equally spaced intervals of the cyclic variable, into which the data are split. The first interval is labeled with 0 and is always centered around 0.
cut	Vector of numerics, logicals or factors as second grouping elements. Its length is equal to the number of rows in x. cut is used to group the observations similar to function [cut]().
labels	Labels for the corresponding intervals. When cut is a logical, labels has to be named in the order: FALSE, TRUE.

breaks, include.lowest, right, dig.lab

> These arguments are only active when cut is numeric and are used in exactly the same way as in [cut]().
> breaks defines the break points.
> include.lowest = TRUE indicates that the lowest (or highest, for right = FALSE) breaks value should be also included.
> right = TRUE indicates that the intervals should be closed on the right (and open on the left) or vice versa for right = FALSE.
> dig.lab number of digits for breaks labeling when labels are *not* given explicitly.

warn	Logical, indicating if warnings should be issued for NAs in cyclVar and / or x-values outside of breaks range.
FUN	Summary function, returning a scalar or vector.
...	Additional arguments for summary function.

Details

The first grouping element, cyclVar, for the summary statistics must be circular and numeric. The second grouping element, cut, can be numeric, logical or a factor.
Not all combinations of arguments are allowed:
Argument cut can only be defined when summary consists of a scalar and x consists of 1 column.
When x contains only one column and cut is *not* defined, the summary function may also be a vector with the restriction, that the summary of each subset, defined by the cyclic variable, must have the same number of elements.
When x is a data frame or matrix with more than 1 column, the summary function must be scalar.

Value

Object of class rose

Author(s)

Rene Locher

See Also

[rose-class](), [plot.rose](), [cart2clock](), [clock2cart]()

Examples

```
## artificial example:
## concentration of A and B as function of
## hour of day (hour) and wind direction (WD)
hour <- rep(0:23,100)
dat <- data.frame(hour = hour,
                  A =    (2*cos((hour+6)/6*pi)+rnorm(24*100,1))^2,
                  B =    (2*cos((hour+4)/6*pi)+rnorm(24*100,1,2))^2,
                  WD =   rnorm(24*100,
                           mean=sample(c(190,220,50),24*100, replace = TRUE),
                           sd=30)%%360)

## two different responses, scalar summary function
mean.windrose <- rose(dat[,c("A","B")],
                      cyclVar=dat$WD,
                      circle=360,
                      FUN=mean, na.rm=TRUE)
mean.windrose

## one response, vectorial summary function
quant.dayrose <- rose(dat$A,
                      cyclVar=dat$hour,
                      n.cyclVar=24, circle=24,
                      FUN=quantile, na.rm=TRUE)
quant.dayrose


mean.windroseB <- rose(dat[,c("A")],
                       cyclVar=dat$WD,
                       circle=360,
                       cut=dat$B,
                       breaks=c(0,30,100),
                       dig.lab=3,
                       FUN=mean, na.rm=TRUE)
mean.windroseB
```

---

rose-class   *rose-class*

Description

Summary statistics of cyclic data.

Objects from the Class

Objects can be created by calls of the form rose(x, cyclVar = NULL, circle = NULL, n.cyclVar = 8, cut = NULL, breaks = NULL, labels = NULL, dig.lab = 2, include.lowest = FALSE, subset = NULL, na.warning = TRUE, FUN = mean, ...)

Slots

rho: Object of class matrix. rho[i,] contains the summary values of all data within the interval defined by the cyclic Variable cyclVar[i]. Column and row names are mandatory. The different columns of rho correspond to different responses when the summary statistics is a scalar *or* to the different elements of a vector summary of one response *or* to the different subsets of the second grouping element.

cyclVar: Object of class numeric containing the center of the interval of the cyclic variable. The values are sorted by increasing values, are unique and cannot contain NA values.

circle: Scalar of class numeric, defining the full circle.

Author(s)

Rene Locher

See Also

For the details of how to create and plot a rose object see rose and plot.rose.

---

showColors   *Displays vectors of colors*

Description

Displays colors produced by a color vector col and labels them by the corresponding number of the element of col.

Usage

```
showColors(col = IDPcolorRamp(20),
           ntm = min(length(col), 20),
           border = TRUE, mar = rep(0,4))
```

Arguments

col	Color vector
ntm	Approximate number of labels printed
border	Shall border be drawn between the colors in the legend: TRUE / FALSE
mar	Margin. cf par

Author(s)

Rene Locher

See Also

IDPcolorRamp, ColorBrewer

Examples

```
showColors(IDPcolorRamp(5))
showColors(IDPcolorRamp(200),border=FALSE)
showColors(IDPcolorRamp(200),border=FALSE,ntm=5)

showColors(IDPcolorRamp(4,
                        colInt = data.frame(
                            h = c(0.47, 0.28, 0.22, 0.2, 0.00),
                            s = c(0.3, 0.55, 0.75, 0.75, 0.75),
                            v = c(1, 1, 1, 1, 1)),
                        fr    = c(0.2,0.2,0.2))
           ,border=FALSE)

showColors(IDPcolorRamp(200,
                        t(col2hsv(c("darkviolet","blue",
                                    "green","yellow","red"))),
                        fr=rep(0.25,3)),border=FALSE)
```

---

title.control   *Auxilary for Controlling the Title of a Rose Plot*

Description

Auxilary for controlling the title of a rose plot.

Usage

```
title.control(text = NULL, cex = 1.5,
              between = if (is.null(text)) 0 else 1)
```

Arguments

text	Title.
cex	Size of characters in title in multiples of cex as defined in general.control.
between	Distance between title and label North. Default units are grid.control(cyclVar.cex). Other units can be defined by unit.

Value

Returns the arguments conveniently packaged up in a list to supply the arguments for the title of plot.rose.

Author(s)

Rene Locher

See Also

[plot.rose](#), [general.control](#)

Examples

```
title.control()
```

---

zoom   *Zooming in and out in a 2d-Plot*

Description

Function to zoom in and out by mouse click in a 2D-plot.

Usage

```
zoom(fun = plot, zoom.col = "red", delay = 3, ...)
```

Arguments

fun	2D-plotting function
zoom.col	Color of clicked points
delay	Number of sec during which the 2 zooming points are shown on the plot before zooming
...	Arguments to plotting function

Details

When the clicked points lay within the plot region range, the points define the new plotting limits. When the clicked points lay in the margin, the plotting limits will be moved into the corresponding direction by 1/3 out of the actual range. There is no special sequential order for the zooming points required. The zooming function is stopped by right clicking and choosing the menu item "stop".

Value

No value returned.

Author(s)

Rene Locher

Examples

```
i <- 1:100
y <- i*sin(i*(pi/16))
y <- c(rev(y),y)

## Not run:
zoom(fun=plot, zoom.col="red", x=1:200, y=y, type="l", xlab="index")
## End( Not run)
```

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