Package ‘MSG’

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andrews_curve

Datasets and functions for the Chinese book “Modern Statistical Graphics”.

Author(s)

Yihui Xie <http://yihui.name>

Description

This function evaluates the transformation of the original data matrix for $t$ from $-\pi$ to $\pi$, and uses matplot to draw the curves.

Usage

\[
\text{andrews_curve}(x, n = 101, \text{type} = "l", \text{lty} = 1, \text{lwd} = 1, \text{pch} = \text{NA}, \text{xlab} = "t", \text{ylab} = "f(t)", \ldots)
\]

Arguments

- \(x\) a data frame or matrix
- \(n\) number of x-axis values at which \(f(t)\) is evaluated
- \(\text{type, lty, lwd, pch, xlab, ylab, \ldots}\) passed to \text{matplot}
assists

**Value**

a matrix of coefficients for each observation at different t values

**Author(s)**

Yihui Xie <http://yihui.name>

**References**

http://fedc.wiwi.hu-berlin.de/xplore/tutorials/mvahtmlnode9.html

**See Also**

matplot

**Examples**

andrews_curve(iris[, -5], col = as.integer(iris[, 5]))

<table>
<thead>
<tr>
<th>assists</th>
<th>Assists between players in CLE and LAL</th>
</tr>
</thead>
</table>

**Description**

The players in the rows assisted the ones in the columns.

**References**

http://www.basketballgeek.com/data/

**Examples**

data(assists)

if (require("sna")) {
  set.seed(2011)
  gplot(assists, displaylabels = TRUE, label.cex = 0.7)
}
BinormCircle

Random numbers containing a “circle”

Description

The data was generated from two independent random variables (standard Normal distribution) and further points on a circle were added to the data. The order of the data was randomized.

Format

A data frame with 20000 observations on the following 2 variables.

V1 the first random variable with the x-axis coordinate of the circle
V2 the second random variable with the y-axis coordinate of the circle

Details

See the example section for the code to generate the data.

Source


Examples

data(BinormCircle)

## original plot: cannot see anything
plot(BinormCircle)

## transparent colors (alpha = 0.1)
plot(BinormCircle, col = rgb(0, 0, 0, 0.1))

## set axes limits
plot(BinormCircle, xlim = c(-1, 1), ylim = c(-1, 1))

## small symbols
plot(BinormCircle, pch = ".")

## subset
plot(BinormCircle[sample(nrow(BinormCircle), 1000), ])

## 2D density estimation
library(KernSmooth)
fit = bkde2D(as.matrix(BinormCircle), dpik(as.matrix(BinormCircle)))
# perspective plot by persp()
persp()
persp(fit$x1, fit$x2, fit$fhat)

if (interactive()) && require("rgl") {

canabalt

# perspective plot by OpenGL
rgl.surface(fit$x1, fit$x2, fit$fhat)
# animation
M = par3d("userMatrix")
play3d(par3dinterp(userMatrix = list(M, rotate3d(M, pi/2, 1, 0, 0), rotate3d(M, pi/2, 0, 1, 0), rotate3d(M, pi, 0, 0, 1))), duration = 20)

## data generation
x1 = rnorm(10000)
y1 = rnorm(10000)
x2 = rep(0.5 * cos(seq(0, 2 * pi, length = 500)), 20)
y2 = rep(0.5 * sin(seq(0, 2 * pi, length = 500)), 20)
x = cbind(c(x1, x2), c(y1, y2))
BinormCircle = as.data.frame(round(x[sample(20000), ], 3))

---

**canabalt**

*The scores of the game Canabalt from Twitter*

**Description**

The scores of the game Canabalt from Twitter

**References**


(the URL is not longer accessible)

**Examples**

```r
library(ggplot2)
data(canabalt)
print(qplot(device, score, data = canabalt))
pdint(qplot(reorder(death, score, median), score, data = canabalt, geom = "boxplot") + coord_flip())
```

---

**char_gen**

*Generate a matrix of similar characters*

**Description**

This function prints a matrix of characters which are very similar to each other.

**Usage**

```r
char_gen(x = c("V", "W"), n = 300, nrow = 10)
```
Arguments

x  a character vector of length 2 (usually two similar characters)
n  the total number of characters in the matrix
nrow  the number of rows

Value

a character matrix on the screen

Author(s)

Yihui Xie <http://yihui.name>

Examples

char_gen()
char_gen(c("0", "0"))

Description

This data contains the life expectancy and number of people with higher education in the 31 provinces and districts in China (2005).

Format

A data frame with 31 observations on the following 2 variables.

Life.Expectancy  Life expectancy
High.Edu.NO  Number of people with higher education

Source


Examples

data(ChinaLifeEdu)
x = ChinaLifeEdu
plot(x, type = "n", xlim = range(x[, 1]), ylim = range(x[, 2]))
u = par("usr")
rect(u[1], u[3], u[2], u[4], col = "antiquewhite", border = "red")
library(KernSmooth)
est = bkde2D(x, apply(x, 2, dpik))
contour(est$x1, est$x2, est$fhat, nlevels = 15, col = "darkgreen", add = TRUE,
vfont = c("sans serif", "plain"))
Description
Country power indicators of China vs America

References
http://www.guardian.co.uk/news/datablog/2011/jan/19/china-social-media

Examples
data(cn_vs_us)

cut_plot

Cut the points in a scatter plot into groups according to x-axis

Description
This function can categorize the variable on the x-axis into groups and plot the mean values of y. The purpose is to show the arbitrariness of the discretization of data.

Usage
cut_plot(x, y, breaks, ..., pch.cut = 20)

Arguments
x the x variable
y the y variable
breaks the breaks to cut the x variable
... other arguments to be passed to plot.default
pch.cut the point symbol to denote the mean values of y

Author(s)
Yihui Xie <http://yihui.name>

Examples
x = rnorm(100)
y = rnorm(100)
cut_plot(x, y, seq(min(x), max(x), length = 5))
**eq2010**

*Longitude and latitude of earthquakes in the Sichuan Province*

**Description**

Longitude and latitude of earthquakes in the Sichuan Province

**Examples**

```r
data(eq2010)
plot(lat ~ long, data = eq2010)
```

---

**Export.USCN**

*Export of US and China from 1999 to 2004 in US dollars*

**Description**

Export of US and China from 1999 to 2004 in US dollars

**Format**

A data frame with 13 observations on the following 3 variables.

- **Export** amount of export
- **Year** year from 1999 to 2004
- **Country** country: US or China

**Source**

http://stat.wto.org

**Examples**

```r
data(Export.USCN)
par(mar = c(4, 4.5, 1, 4.5))
plot(1:13, Export.USCN$Export, xlab = "Year / Country", ylab = "US Dollars ($\times 10^16)"",
axes = FALSE, type = "h", lwd = 10, col = c(rep(2, 6), NA, rep(4, 6)), lend = 1,
panel.first = grid())
xlabel = paste(Export.USCN$Year, "\n", Export.USCN$Country)
xlabel[7] = ""
xlabel
abline(v = 7, lty = 2)
axis(1, at = 1:13, labels = xlabel, tick = FALSE, cex.axis = 0.75)
axis(2)
(ylabel = pretty(Export.USCN$Export * 8.27))
axis(4, at = ylabel/8.27, labels = ylabel)
mtext("Chinese RMB", side = 4, line = 2)
box()
```
Percentage data in Chinese government websites

Description
This data was collected from Google by searching for percentages in Chinese government websites.

Format
A data frame with 10000 observations on the following 4 variables.

- **percentage**: a numeric vector: the percentages
- **count**: a numeric vector: the number of webpages corresponding to a certain percentage
- **round0**: a logical vector: rounded to integers?
- **round1**: a logical vector: rounded to the 1st decimal place?

Details
We can specify the domain when searching in Google. For this data, we used `site:gov.cn`, e.g. to search for '87.53% site:gov.cn'.

Source
Google (date: 2009/12/17)

Examples
```r
data(gov.cn.pct)
pct.lowess = function(cond) {
  with(gov.cn.pct, {
    plot(count ~ percentage, pch = ifelse(cond, 4, 20), col = rgb(0, 1, 0, c(0.04, 0.5))[cond + 1], log = "y")
    lines(lowess(gov.cn.pct[cond, 1:2], f = 1/3), col = 2, lwd = 2)
    lines(lowess(gov.cn.pct[!cond, 1:2], f = 1/3), col = 1, lwd = 2)
  })
}
par(mar = c(3.5, 3.5, 1, 0.2), mfrow = c(2, 2))
with(gov.cn.pct, {
  plot(percentage, count, type = "l", panel.first = grid())
  plot(percentage, count, type = "l", xlim = c(10, 11), panel.first = grid())
  pct.lowess(round0)
  pct.lowess(round1)
})
if (interactive()) {
  devAskNewPage(ask = TRUE)
}
with(gov.cn.pct, {
  plot(count ~ percentage, type = "l")
  grid()
}
hearts_curve

Draw a heart curve

Description

Calculate the coordinates of a heart shape and draw it with a polygon.

Usage

hearts_curve(n = 101, ...)

Arguments

n

the number of points to use when calculating the coordinates of the heart shape

... other arguments to be passed to polygon, e.g. the color of the polygon (usually red)

Author(s)

Yihui Xie <http://yihui.name>
**Examples**

heart_curve()
heart_curve(col = "red")
heart_curve(col = "pink", border = "red")

---

**murcia**

*Composition of Soil from Murcia Province, Spain*

**Description**

The proportions of sand, silt and clay in soil samples are given for 8 contiguous sites. The sites extended over the crest and flank of a low rise in a valley underlain by marl near Albudeite in the province of Murcia, Spain. The sites were small areas of ground surface of uniform shape internally and delimited by relative discontinuities externally. Soil samples were obtained for each site at 11 random points within a 10m by 10m area centred on the mid-point of the site. All samples were taken from the same depth. The data give the sand, silt and clay content of each sample, expressed as a percentage of the total sand, silt and clay content.

**References**

http://www.statsci.org/data/general/murcia.html

**Examples**

data(murcia)
boxplot(sand ~ site, data = murcia)

---

**music**

*Attributes of some music clips*

**Description**

Attributes of some music clips

**References**


**Examples**

data(music)
### PlantCounts

*Number of plants corresponding to altitude*

**Description**

For each altitude, the number of plants is recorded.

**Format**

A data frame with 600 observations on the following 2 variables.

- **altitude** altitude of the area
- **counts** number of plants

**Source**


**Examples**

```r
## different span for LOWESS
data(PlantCounts)
par(las = 1, mar = c(4, 4, 0.1, 0.1), mgp = c(2.2, 0.9, 0))
with(PlantCounts, {
  plot(altitude, counts, pch = 20, col = rgb(0, 0, 0.5), panel.first = grid())
  for (i in seq(0.01, 1, length = 70)) {
    lines(lowess(altitude, counts, f = i), col = rgb(0, i, 0), lwd = 1.5)
  }
})
```

### quake6

*Earth quakes from 1973 to 2010*

**Description**

The time, location and magnitude of all the earth quakes with magnitude being greater than 6 since 1973.

**References**

[http://cos.name/cn/topic/101510](http://cos.name/cn/topic/101510)

**Examples**

```r
data(quake6)
library(ggplot2)
qplot(year, month, data = quake6) + stat_sum(aes(size = ..n..)) +
  scale_size(range = c(1, 10))
```
Description

Given that the variances of two groups are unequal, we compute the difference of P-values assuming equal or unequal variances respectively by simulation.

Format

A data frame with 1000 rows and 99 columns.

Details

See the Examples section for the generation of this data.

Source

By simulation.

References


Examples

data(t.diff)
boxplot(t.diff, axes = FALSE, xlab = expression(n[1]))
axis(1)
axis(2)
box()

## reproducing the data
if (interactive()) {
  set.seed(123)
  t.diff = NULL
  for (n in 2:100) {
    t.diff = rbind(t.diff, replicate(1000, {
      x1 = rnorm(n1, mean = 0, sd = runif(1, 0.5, 1))
      x2 = rnorm(30, mean = 1, sd = runif(1, 2, 5))
      t.test(x1, x2, var.equal = TRUE)$p.value - t.test(x1, x2,
        var.equal = FALSE)$p.value
    }))
  } 
  t.diff = as.data.frame(t(t.diff))
  colnames(t.diff) = 2:100
}
tukeyCount

Results of a Simulation to Tukey's Fast Test

### Description

For the test of means of two samples, we calculated the P-values and recorded the counts of Tukey's rule of thumb.

### Format

A data frame with 10000 observations on the following 3 variables.

- `pvalue.t` P-values of t test
- `pvalue.w` P-values of Wilcoxon test
- `count` Tukey's counts

### Details

See the reference for details.

### Source

Simulation; see the Examples section below.

### References


### Examples

```r
data(tukeyCount)

## does Tukey's rule of thumb agree with t test and Wilcoxon test?
with(tukeyCount, {
  ucount = unique(count)
  stripchart(pvalue.t ~ count, method = "jitter", jitter = 0.2, pch = 19,
             cex = 0.7, vertical = TRUE, at = ucount - 0.2, col = rgb(1, 0, 0, 0.2),
             xlim = c(min(count) - 1, max(count) + 1), xaxt = "n", xlab = "Tukey Count",
             ylab = "P-values")
  stripchart(pvalue.w ~ count, method = "jitter", jitter = 0.2, pch = 21,
             cex = 0.7, vertical = TRUE, at = ucount + 0.2, add = TRUE, col = rgb(0,
             1, 0, 0.2), xaxt = "n")
  axis(1, unique(count))
  lines(sort(ucount), tapply(pvalue.t, count, median), type = "o", pch = 19,
         cex = 1.3, col = "red")
  lines(sort(ucount), tapply(pvalue.w, count, median), type = "o", pch = 21,
         cex = 1.3, col = "blue", lty = 2)
  legend("topleft", c("t test", "Wilcoxon test"), col = c("red", "blue"),
         cex = 0.7)
})
```
### tvearn

The pay per episode for actors as well as other information.

**References**

http://flowingdata.com/2011/02/15/visualize-this-tvs-top-earners/

**Examples**

```r
data(tvearn)
plot(pay ~ rating, data = tvearn)
library(ggplot2)
qplot(pay, data = tvearn, geom = "histogram", facets = gender ~ ., binwidth = 20000)
qplot(rating, pay, data = tvearn, geom = c("jitter", "smooth"), color = type)
```

### vec2col

Generate colors from a vector

This function generates a color vector from an input vector, which can be of the class numeric or factor.
Usage

```r
vec2col(vec, n, name)
```

## Default S3 method:

```r
vec2col(vec, n, name)
```

## S3 method for class 'factor'

```r
vec2col(vec, n, name)
```

Arguments

- `vec` the numeric or factor vector
- `n` the number of colors to be generated from the palette
- `name` the name of the palette

Value

a vector of colors corresponding to the input vector

Author(s)

Yihui Xie &lt;http://yihui.name&gt;

Examples

```r
## convert factor to colors
with(iris, plot(Petal.Length, Petal.Width, col = vec2col(Species), pch = 19))

# another palette
with(iris, plot(Petal.Length, Petal.Width, col = vec2col(Species, name = "Dark2"),
               pch = 19))

## turn numeric values to colors
with(iris, plot(Petal.Length, Petal.Width, col = vec2col(Petal.Width), pch = 19))
```
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