Package 'distfree.cr'

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Type Package

Title Distribution-Free Confidence Region

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Description Constructs confidence regions without the need to know the sampling distribution of bivariate data. The method was proposed by Zhiqiu Hu & Rongcai Yang (2013) <doi:10.1371/journal.pone.0081179.g001>.

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License GPL (>= 2)

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R topics documented:

`distfree.cr-package` *Distribution-free confidence region (distfree.cr)*

Description

The disfree.cr package was developed to implement a novel geometry-based method introduced by Zhiqiu Hu and Rong-cai Yang for constructing confidence regions without the need to know the sampling distribution of estimated parameters for two or more variables.

Details

Package:	distfree.cr
Type:	Package
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Author(s)

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`distfree.cr` *distfree.cr*

Description

Constructs empirical confidence regions for bivariate data based on the method proposed by Zhiqiu Hu and Rong-cai Yang(2013) <doi:10.1371/journal.pone.0081179.g001>.

Usage

```
distfree.cr(x, y, alpha = 0.05, alpha.min.diff = 0.5/NROW(x), nknots = 40,
            xlab = deparse(substitute(x)), ylab = deparse(substitute(y)),
            col = c("red", "black", "gray"), draw = T)
```

Arguments

`x`	numeric vector, of dimensions *nobs* * 1. If a data frame or a two-column numeric matrix of x and y is supplied here, the second option y of the function needs to be ignored.

y	numeric vector, of dimensions *nobs* * 1. This option needs to be ignored if users provided both x and y in the first option of the function.
alpha	Significant level. By default alpha is set to be 0.05.
alpha.min.diff	minimum difference is allowed for calculating confidence region. This option is not suggested for most users. The default value is set to be alpha/10.
nknots	number of knots that will be used to enclose the confidence region. The default value nknots=40 is recommended for all users.
xlab	define the label of x axis of the plot.
ylab	define the label of y axis of the plot.
col	define colors of the scatter points and lines of the plot. The default setting col=("red", "black", "gray") are the colors for the lines enclosed the region, the points within the region and the points outside of the region, respectively.
draw	a logical indicator. Users may disable plotting by setting the option to FALSE

Details

This function constructs a distribution-free confidence region based on the method proposed by Zhiqiu Hu and Rong-cai Yang.

Value

alpha.realized	Realized-alpha, which is defined as the proportion of the total points outside the confidence region.
polygon	'data.frame' of x,y providing the apexes of the lines.
polygon.smooth1	'data.frame' of x,y providing the apexes of the smoothed polygon 1.
polygon.smooth2	'data.frame' of x,y providing the apexes of the smoothed polygon 2.
data	'data.frame', of dimension *nobs* * 3, the first two columns are input data of x and y values and the third column data$pip are indicators of whether the points are within (1) or outside (0) the confidence region.
alpha,xlab,ylab,col	values assigned by users.

Note

A smooth confidence region can be achieved by setting up a big number for input variable nknots, and this in turn requires large sample sizes.

Author(s)

Zhiqiu Hu and Rong-cai Yang

Examples

```
library(distfree.cr)
dat=data.frame(x=c(rnorm(3000), rnorm(3000, mean=1, sd=2.5)),
               y=c(rnorm(3000), rnorm(3000, mean=1, sd=2.5)))
pt=distfree.cr(dat, draw=TRUE, alpha=0.05)
pt=distfree.cr(x=dat$x, y=dat$y, draw=FALSE)
plot(pt)
```

`plot.distfree.cr` *plot.distfree.cr*

Description

Plot an object that is returned by the distfree.cr function.

Usage

```
## S3 method for class 'distfree.cr'
plot(x, show.points = T, ...)
```

Arguments

`x`	An object returned by the distfree.cr function.
`show.points`	A logical indicator of whether or not the original data are plotted.
`...`	Other parameters that can be passed to the `plot` function.

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