Package ‘distfree.cr’

June 15, 2018

Type Package
Title Distribution-Free Confidence Region
Version 1.5.1
Date 2018-06-13
Author Zhiqiu Hu, Rong-cai Yang
Maintainer Zhiqiu Hu <zhiqiu.hu@gmail.com>
Description Constructs confidence regions without the need to know the sampling distribution of bivariate data. The method was proposed by Zhiqiu Hu & Rong-cai Yang (2013) <doi:10.1371/journal.pone.0081179.g001>.
Depends R (>= 2.10)
License GPL (>= 2)
URL http://statgen.ualberta.ca
RoxygenNote 6.0.1
NeedsCompilation no
Repository CRAN
Date/Publication 2018-06-15 14:21:16 UTC

R topics documented:

  distfree.cr-package ........................................... 2
  distfree.cr .................................................. 2
  plot.distfree.cr ............................................. 4

Index 5
The distfree.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**

<table>
<thead>
<tr>
<th>Package:</th>
<th>distfree.cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Package</td>
</tr>
<tr>
<td>Version:</td>
<td>1.0</td>
</tr>
<tr>
<td>Date:</td>
<td>2012-11-23</td>
</tr>
<tr>
<td>License:</td>
<td>GPL (&gt;2.0)</td>
</tr>
</tbody>
</table>

**Author(s)**

Zhiqiu Hu and Rong-cai Yang

Maintainer: Zhiqiu Hu <zhiqiu.hu@gmail.com>

**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**

```r
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.
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 \( \text{alpha}/10 \).

**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**
declare 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

```r
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)
```

Description

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

Usage

```r
## 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.
Index

*Topic package
   distfree.cr-package, 2

distfree.cr, 2
distfree.cr-package, 2

plot.distfree.cr, 4