

Package ‘chplot’

January 2, 2012

Title Augmented Convex Hull Plots

Version 1.3.1

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Depends ellipse, KernSmooth, lattice

Description Informative and nice plots for grouped bivariate data.

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Repository CRAN

Date/Publication 2009-01-23 17:42:57

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chadd	<i>Add elements to a chplot</i>
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Description

chadd is a function that adds any further elements to a plot produced with the function chplot.

Usage

```
chadd(param, pos, add.fun, ...)
```

Arguments

param	the parameters specifying the plotting regions. As obtained from <code>chplot</code> .
pos	the plotting region to which an element is to be added: 1 for the main plot, 2 for top left (marginal distribution plot of the x-variable), 3 for top right (the legend), 4 for bottom right (marginal distribution plot of the y-variable).
add.fun	the function to be applied.
...	optional parameters to <code>add.fun</code> , separated by commas.

See Also

[chplot](#).

Examples

```
data(hdr)
# hdr dataset
postscript("file.ps", fonts="mono")      # For screen output, skip this

param<-chplot(age~income|gender,data=hdr,log="x")
# box around the legend region
chadd(param,3,box,"figure")
# tickmark for overall mean in marginal distribution plots
chadd(param,2,lines,c(mean(hdr$income),mean(hdr$income)),c(0,.05))
chadd(param,4,lines,c(0,.025),c(mean(hdr$age),mean(hdr$age)))
dev.off()      # For screen output, skip this
```

chplot

Augmented Convex Hull Plot

Description

Plots 2D convex hulls or bivariate density contours, one for each group of data. Descriptive statistics are plotted as error bars or confidence ellipses within convex hulls. Marginal distributions as well as a special legend are added by default. Additionally, area of convex hull per point can be displayed.

Usage

```
chplot(formula,data,chull=TRUE,clevel=0.95,band.power=.2,
mar.den=FALSE,descriptives="mean.sd",dlevel=0.68,bw=FALSE,ratio=.75,
plot.points=FALSE,log="",xlab,ylab,col,lty,lwd,legend=TRUE,...)
```

Arguments

formula	a formula describing the form of conditioning plot. The formula is generally of the form $y \sim x \mid g1$, indicating that plots of y (on the y axis) versus x (on the x axis) should be produced conditional on the variable $g1$. However, the conditioning variable $g1$ may be omitted. The names of the y , x and $g1$ variables are used for the axes and legend title.
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<code>data</code>	a data frame containing values for any variables in the formula.
<code>chull</code>	logical; if TRUE (default), convex hulls are plotted, otherwise density contours are drawn.
<code>clevel</code>	the confidence level for the density plot if <code>chull=FALSE</code> (default is 0.95).
<code>band.power</code>	applies if <code>chull=FALSE</code> ; bandwidth for bivariate density estimation is calculated as $(\text{group size})^{(-\text{band.power})}$ for each group (default is 0.2).
<code>mar.den</code>	logical; defines the type of marginal distribution plots. If FALSE (default), relative frequency polygons are plotted, otherwise density plots are drawn.
<code>descriptives</code>	the option to be used for depicting descriptive statistics. The default value is <code>mean.sd</code> , which produces a cross with the lines intersecting at the mean of <code>x</code> and <code>y</code> for each group and depicting the 68-percent tolerance interval (i.e., stretching one standard deviation in each direction) with default <code>dlevel</code> setting. Option <code>mean.se</code> does the same with standard errors of the means, while <code>median</code> makes the lines one quartile long in each direction and cross at the median. Option <code>ellipse</code> plots confidence ellipses.
<code>dlevel</code>	the tolerance/confidence level applied if <code>descriptives=mean.sd</code> or <code>mean.se</code> .
<code>bw</code>	logical; if TRUE, the plot is produced in black-and-white. The default is FALSE, which plots in colour.
<code>ratio</code>	the ratio of the main plot to the whole figure region. The default value is 0.75. If equal to 1, the marginal distributions are not plotted. If the ratio is less or equal to 0.75, the default legend position is outside the main plot (i.e., in the top right corner), otherwise it is within the main plot (i.e., to be selected by the user with mouse).
<code>plot.points</code>	are the points added to the original plot? Default is FALSE.
<code>log</code>	the character strings "x", "y" or "xy" makes a specific (or both) axes logarithmic; the default, which does nothing, is "".
<code>xlab</code>	a title for the x axis in the main plot; the default is the name of the x variable.
<code>ylab</code>	a title for the y axis in the main plot; the default is the name of the y variable.
<code>col</code>	the plotting colors; vector of length equalling the number of groups.
<code>lty</code>	the type of line; vector of length equalling the number of groups.
<code>lwd</code>	line width; vector of length equalling the number of groups.
<code>legend</code>	either logical, in which case the default is TRUE and a legend is drawn with the default settings, or a list of legend parameters. For legend parameters, see the <code>legend</code> function; two additional parameters are allowed: <code>area.in</code> (logical; specifies whether the area of convex hull per point is displayed; default is TRUE if <code>chull=TRUE</code> and FALSE otherwise), and <code>pos</code> (<code>in</code> or <code>out</code> ; default depends on <code>ratio</code> value; if <code>in</code> is chosen, the legend is positioned by the user with mouse, while <code>out</code> places the legend in the top right corner of the plotting area). Note that the default legend parameters are not the same as in the <code>legend</code> function: default title is the name of the grouping variable, default <code>bty</code> depends on legend position ("o" if inside and "n" if outside), while default <code>cex</code> is calculated on the basis of <code>ratio</code> , and the <code>cex</code> option is the multiplier of that default.
<code>...</code>	other arguments will be passed to the main plotting region and will affect points if <code>plot.points=TRUE</code> .

Details

The relative frequency polygons chosen with `mar.den=FALSE` connect the points in the middle of the intervals and the starting and ending interval with zero frequency in each group. All the frequencies are rescaled in order to make the plots immediately comparable (the same is true for the density curves).

The default density contour might not fit into the plot - this can be avoided by decreasing the `clevel`. In case of broken contours, the area per point is not a sensible measure.

Value

A list with components:

<code>area</code>	the area of convex hull per point for each group.
<code>usrc</code>	the limits of the central plotting region.
<code>usru</code>	the limits of the top left plotting region.
<code>usrr</code>	the limits of the bottom right plotting region.
<code>ratio</code>	the ratio used.
<code>is.xlog</code>	logical, denoting whether either <code>log="x"</code> or <code>log="xy"</code> was used.
<code>is.ylog</code>	logical, denoting whether either <code>log="y"</code> or <code>log="xy"</code> was used.

References

Vidmar, G., and Pohar, M. Augmented convex hull plots: rationale, implementation in R and biomedical applications. *Computer Methods and Programs in Biomedicine*, 2005, 78, 69-74.

See Also

[chadd](#), [chull](#), [bkde2D](#).

Examples

```
# the hdr dataset
postscript("file.ps", fonts="mono")          # For screen output, skip this
data(hdr)
chplot(age~income|gender, data=hdr, log="x")
# the iris dataset
data(iris)
chplot(Sepal.Length~Sepal.Width|Species, data=iris, bw=TRUE,
       legend=list(cex=.6))
chplot(Petal.Length ~ Petal.Width | Species, data = iris,
       legend = list(cex = 0.6), plot.points=TRUE, pch = 18, cex = 0.5)
dev.off() # For screen output, skip this
```

hdr

Deceased in Slovenia in 1998

Description

Personal income tax paid (in SIT), age (in years) and gender for deceased in Slovenia in 1998.

Usage

`data(hdr)`

Format

hdr is a list with 9051 cases (rows) and 3 variables (columns) named `income`, `age` and `gender`.

Source

Statistical Office of the Republic of Slovenia.

References

Javornik, J., and Korosec, V. Eds. (2003) *Human development report Slovenia 2002/2003: Human development and health*. Ljubljana: Institute of Macroeconomic Analysis and Development.

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