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Description A set of functions to build simple GUI controls for R functions. These are built on the 'tcltk' package. Uses could include changing a parameter on a graph by animating it with a slider or a ``doublebutton'', up to more sophisticated control panels. Some functions for specific graphical tasks, referred to as 'cartoons', are provided.

License GPL (>= 2)

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Contents

rpanel-package . . . 3
aircond . . . 5
Astrand . . . 6
cholesterol . . . 6
Clyde . . . 7
CofE . . . 8
doctors_smoking . . . 8
flour_beetles . . . 9
gullweight . . . 9
Hyde . . . 10
Loch_Leven . . . 11
luthor . . . 11
mammal_speed . . . 12
poisons . . . 13
river . . . 13
rodent . . . 14
rp.ancova . . . 15
rp.anova . . . 16
rp.block . . . 18
rp.bubbleplot . . . 19
rp.button . . . 20
rp.cartoons . . . 21
rp.checkbox . . . 22
rp.ci . . . 24
rp.clearlines . . . 25
rp.coefficients . . . 26
rp.colour.key . . . 27
rp.colours . . . 28
rp.combo . . . 29
rp.contingency . . . 31
rp.control . . . 32
rp.control.put . . . 33
rp.datalink . . . 34
rp.deleteline . . . 36
rp.do . . . 37
rp.doublebutton . . . 38
rp.drop1 . . . 40
rp.firth . . . 41
rp.geosim . . . 42
rp.grid . . . 44
rp.gulls . . . 45
rp.image . . . 46
rp.likelihood . . . 48
rp.line . . . 49
rp.listbox . . . 51
rp.lm . . . 53

rp.logistic . . . 55
rp.menu . . . 56
rp.messagebox . . . 58
rp.mururoa . . . 59
rp.normal . . . 60
rp.notebook . . . 61
rp.panel . . . 63
rp.plot3d . . . 64
rp.plot4d . . . 65
rp.pos . . . 69
rp.power . . . 70
rp.radiogroup . . . 72
rp.regression . . . 73
rp.rmplot . . . 76
rp.sample . . . 78
rp.screenresolution . . . 80
rp.slider . . . 81
rp.surface . . . 83
rp.t_test . . . 85
rp.tables . . . 87
rp.text . . . 88
rp.textentry . . . 90
rp.timer . . . 92
rp.tkrplot . . . 93
rp.var.get . . . 94
rp.var.put . . . 95
rp.widget.dispose . . . 96
rp.wrangle . . . 97
Scottish_referendum . . . 97
SO2 . . . 98
vasoconstriction . . . 98
worldbank . . . 99

Index **100**

`rpanel-package` *Simple interactive controls for R functions using the tcltk package*

Description

rpanel provides a set of functions to build simple GUI controls for R functions. Uses include changing a parameter on a graph (and animating it) with a slider, or a "doublebutton", up to more sophisticated mini-applications. In addition to functions which create controls, a number of 'cartoon' functions built on these controls are also available.

Details

This package contains a number of functions (with help and examples) and several example scripts.

Cartoon functions:

rp.ci: Confidence intervals
rp.coefficients: Visualisation of the effects of the coefficients in a linear model or glm
rp.contingency: Visualisation of two-way contingency tables with uncertainties
rp.drop1: Visualisation of the results of dropping all single terms from a model
rp.firth: Sampling in a firth
rp.geosim: Simulation of spatial processes
rp.gulls: An interactive problem-solving exercise on deciding the sex of a herring gull
rp.likelihood: Exploration of one and two parameter likelihood functions
rp.lm: Visualisation of linear models with one or two explanatory variables
rp.logistic: Interactive display of logistic regression with a single covariate
rp.mururoa: Sampling in Mururoa Atoll
rp.normal: Fitting a normal distribution to a single sample
rp.plot3d: Interactive display of a plot of three variables
rp.plot4d: Interactive display of a plot of four variables
rp.power: Power calculations for a two-sample t-test
rp.rmplot: Plotting of repeated measurement data
rp.sample: Interactive exploration of sampling variation
rp.surface: Displaying the uncertainty in an estimate of a surface
rp.t_test: Visualisation for inference in comparing the means of one or two samples
rp.tables: Interactive statistical tables
rp.spacetime: A version of rp.plot4d designed for space-time data

Functions to create individual controls:

rp.control: create an rpanel
rp.slider: add a slider to a panel, to graphically control a numeric variable
rp.textentry: adds a box allows text to be entered
rp.button: adds a button to the panel with a nominated function called on pressing
rp.checkbox: adds a checkbox to the panel, to control a logical variable
rp.radiogroup: adds a set of radiobuttons to the panel
rp.listbox: adds a listbox to the panel
rp.combo: adds a combo box to the panel
rp.doublebutton: adds a widget with '+' and '-' buttons, to increment and decrement a variable
rp.menu: adds a menu to the panel
rp.text: adds a text box to the panel
rp.image: adds an image to the panel; the action function is called with coordinates on clicking
rp.line: draws a line connecting the pixel locations x1, y1 to x2, y2 on the specified rp.image
rp.deleteline: removes a line from an rp.image
rp.clearlines: removes all lines from an rp.image
rp.messagebox: displays a message in a pop-up window
rp.tkrplot: allows R graphics to be displayed in a panel
rp.tkrreplot: allows R graphics to be refreshed in a panel.
rp.timer: executes an action function repeatedly until a condition is satisfied

rp.block: blocks use of the R console until a panel is closed
rp.panel: returns a named panel or the most recently created panel
rp.var.put: place an object into the rpanel environment, usually within a panel
rp.var.get: retrieve an object from the rpanel environment, usually from a panel
rp.pos: a demonstration function for layout control
rp.grid: a grid system for layout control
rp.do: executes a nominated user defined callback function
rp.colour.key: a colour key to associate with a plot

Generally speaking these functions have a parameter, name, which is used to later delete or modify a widget.

Author(s)

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References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.control,rp.button,rp.slider,rp.doublebutton,rp.textentry,rp.checkbox,rp.radiogroup

Examples

```
## Not run:
   rp.gulls()

## End(Not run)
```

---

aircond *Intervals between the failure of air-conditioning equipment in aircraft*

Description

These data, reported by Proschan (1963, Technometrics 5, 375-383), refer to the intervals, in service-hours, between failures of the air-conditioning equipment in a Boeing 720 aircraft. (Proschan reports data on 10 different aircraft. The data from only one of the aircraft is used here. Cox and Snell (1981, Applied Statistics: principles and examples, Chapman and Hall, London) discuss the analysis of the data on all 10 aircraft.)

The dataset consists of a single vector of data. They are used in the rp.likelihood example script.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.likelihood("sum(log(dexp(data, theta)))", aircond, 0.005, 0.03)
   rp.likelihood("sum(log(dgamma(data, theta[1], theta[2])))",
        aircond, c(0.3, 0.005), c(3, 0.06))

## End(Not run)
```

Astrand *Physical working capacity in relation to sex and age*

Description

In an interesting early study on changes in 'working capacity' with sex and age, Astrand (1952) recorded measurements of a variety of physiological parameters in subjects who undertook exercise at maximal intensity.

References

Astrand, Per-Olof. Experimental studies of physical working capacity in relation to sex and age. Munksgaard Forlag.

Examples

```
## Not run:
plot(Heart_rate ~ Age, data = Astrand)

## End(Not run)
```

---

cholesterol *Cholesterol and age for samples of women in Iowa and Nebraska*

Description

Snedecor & Cochran (1967) report a subsample of measurements from an early study of health and nutrition by Swanson et al. (1955), with a particular focus on cholesterol. Women were recruited from both Iowa and Nebraska and there is interest in whether there is any evidence of a systematic difference between the groups. If there is no evidence of a difference, the groups might reasonably be pooled. An upward trend in cholesterol with age is expected.

The `cholesterol` dataframe consists of three columns of data:

- Age: age in years;
- Cholesterol: cholesterol in mg / 100 ml;
- Location: The state of residence, Iowa or Nebraska.

References

Snedecor, George W. and Cochran, William G. (1967). Statistical Methods. The Iowa State University Press, USA. Swanson, P., Levertost, R., Gram, M. R., Roberts, H. and Pesek, I. (1955). Blood values of women : cholesterol. Journal of Gerontology 10, 41-47.

Examples

```
## Not run:
library(ggplot2)
ggplot(cholesterol, aes(Age, Cholesterol, col = Location)) + geom_point()

## End(Not run)
```

Clyde *Water quality in the River Clyde*

Description

These data record the water quality, in terms of dissolved oxygen (DO) on a percentage scale, at a number of sampling stations (Station) on the River Clyde. The date (Day, Month, Year) is also available, along with the day of the year (Doy between 1 and 365) and an identified (id) of the survey on which each measurement was made.

The data are used in the rp.plot4d example script.

The data were kindly provided by the Scottish Environment Protection Agency, with the assistance of Dr. Brian Miller.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  with(Clyde, {
    rp.plot4d(cbind(Doy, DO), Station, location.plot = FALSE)
    rp.plot4d(cbind(Station, DO), Doy, location.plot = FALSE)
  })

## End(Not run)
```

CofE *Giving in the Church of England*

Description

These data record the average annual giving in pounds per church member in the dioceses of the Church of England in the early 1980's. Three potentially relevant covariates are also recorded for each diocese, namely the percentage of the population who are employed, the percentage of the population on the electoral roll of the church and the percentage of the population who usually attend church. Background details are available in Pickering (1985; Applied Economics 17, 619-32).

The data are used in the `rp.regression` example script.

References

Pickering, J.F. (1985). Giving in the Church of England: an econometric analysis. Applied Economics 17, 619-632.

Examples

```
## Not run:
  with(CofE, {
    rp.regression(cbind(Employ, Attend), Giving)
  })

## End(Not run)
```

doctors_smoking *Smoking habits among doctors*

Description

These data are from a famous study, initiated by Doll & Hill, which surveyed UK doctors and related their smoking habits to subsequent coronary-related deaths. The data in a form reduced to person-years exposure was reported by Breslow (1985).

References

Breslow, N.E. (1985) Cohort Analysis in Epidemiology. In 'A Celebration of Statistics', A.C. Atkinson and S.E. Fienberg (editors), 109-143. Springer-Verlag.

Doll, R. and Hill, A.B. (1966) Mortality of British doctors in relation to smoking: Observations on coronary thrombosis. National Cancer Institute Monograph, 19, 205-268.

flour_beetles *Toxins for the eradication of flour beetles*

Description

The 'confused flour beetle' *Tribolium confusum* can infest stored flour and grain. These data on the numbers of beetles killed by exposure to different concentrations of multiple toxins. The data were reported in an early paper by Strand (1930) on how to measure the toxicity of compounds. The trials of some compounds were replicated. Toxin concentration is measured in mg/l.

References

Strand, A.L. (1930). Measuring the toxicity of insect fumigants. Industrial & Engineering Chemistry Analytical Edition, 2, 4-8.

Examples

```
## Not run:
hacid <- subset(flour_beetles, Toxin == "Hydrocyanic_acid")
plot(Dead / (Living + Dead) ~ Concentration, data = hacid)

## End(Not run)
```

gullweight *The weights of herring gulls captured at different times of year*

Description

These data are part of a large sample collected by Prof. P. Monaghan of the University of Glasgow in a study of the weight changes in herring gulls throughout the year. Some birds were caught in June (coded as month 1) and others in December (month 2). Since weight is dependent on the size of the bird this information is recorded in the form of the head and bill length, `hab` (in mm), the distance from the back of the head to the tip of the bill.

Note that from version 1.1.6 of the package, `month` is defined as factors rather than as a simple numerical code.

The data are used in the `rp.ancova` example script.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   with(gullweight, {
     rp.ancova(hab, weight, month)
   })

## End(Not run)
```

Hyde *Data on longevity and father's age, from the Hyde genealogy*

Description

In addition to his pioneering work on the telephone, Alexander Graham Bell was also interested in heredity. He was one of the first people to investigate the relationship between longevity and the age of parents. His book 'The duration of life and conditions associated with longevity: a study of the Hyde genealogy' describes data from the descendants William Hyde, one of the early settlers of Norwich, Conn., who died in 1681. The data were retrieved from the 'Genealogy of the Hyde Family' by Reuben H. Waiworth, LL. D. (1864). The Appendix of the book by Bell refers to tables of detailed data published in Bell's own journal, the Beinn Bhreagh Recorder. These include Table 7: Age at death by father's age when person was born (B. B. Rec., IX, 143-171).

The `hyde` dataframe consists of three columns of data:

- `Father`: age of the father at the birth of the child;
- `Child`: age of the child at death;
- `Frequency`: the number of cases with this combination of ages in the Hyde genealogy.

Access to these data was kindly facilitated by the Manuscript Division of the US Library of Congress where the Alexander Graham Bell family papers are held.

References

Bell, A.G. (1918). The duration of life and conditions associated with longevity: a study of the Hyde genealogy. Genealogical Record Office.

Alexander Graham Bell family papers, 1834-1974. US Library of Congress. https://lccn.loc.gov/mm76051268.

Waiworth, R. H. (1864). Genealogy of the Hyde Family.

Examples

```
## Not run:
ind  <- rep(1:nrow(Hyde), Hyde$Frequency)
Hyde <- Hyde[ind, 1:2]
hist(Hyde$Child)

## End(Not run)
```

Loch_Leven *Data on longevity and father's age, from the Hyde genealogy*

Description

Loch Leven is situated in lowland Scotland in the Perth and Kinross area. It is the largest shallow lake in Great Britain with an area of 13.3km^2, mean depth 3.9m and a maximum depth 25.5m. Regular monitoring is carried out by the *Centre for Ecology & Hydrology* in Edinburgh.

One of the features of interest is the water quality and hence the relationship between *chlorophyll$_a$* (as an indicator of water quality) and *soluble reactive phosphorus* (a nutrient) is very important. The monthly means for chlorophyll$_a$ ('lchla') and soluble reactive phosphorus ('srp') are provided from January 1988 to December 2007, along with the 'year' and 'month' of each measurement. The `Loch_Leven` dataframe consists of four variables:

- `year`: the year of the measurement;
- `month`: the month of the measurement, as an integer (1-12);
- `chla`: the measurement of chlorophyll$_a$;
- `srp`: the measurement of soluble reactive phosphorus.

References

Ferguson, C.A., Bowman, A.W., Scott, E.M., Carvalho, L. (2009). Multivariate varying-coefficient models for an ecological system. Environmetrics 20.4, 460-476.

Examples

```
## Not run:
with(Loch_Leven, plot(year, log(chla)))

## End(Not run)
```

luthor *Repeated measurements on leutinizing hormone in cows*

Description

These data, reported by Raz(1989, Biometrics 54, 851-71) refer to an experiment which compared the concentrations of leutinizing hormone (LH) in 16 suckled and 16 non-suckled cows. Measurements were made daily from day 1 through to day 4 postpartum, and twice daily from day 5 through to day 10 postpartum. The cows were ovariectomised on day 5 postpartum.

The first column of the dataset defines the group (1 - non-suckled, 2 - suckled) while the remaining columns give the LH values at the successive recording times.

The data are used in the `rp.rmplot` example script.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   LH <- luthor[,2:16]
   gp     <- factor(luthor[,1])
   times  <- c(1:5,(5+(1:10)/2))
   rp.rmplot(log(LH), fac = gp, timept = times)

## End(Not run)
```

`mammal_speed` *Data on maximal running speed and body mass in terrestrial mammals*

Description

In an investigation of the relationship between mass (kg) and maximal running speed (km/hr) in terrestrial mammals, Garland (1983) collected information from published articles on these two variables for a large number of different species. The measurements are not all recorded to the same level of accuracy since the results have been collated from the work of a number of different scientists.

The `mammal_speed` dataframe consists of four columns of data:

- `Name`: the name of the mammal;
- `Family`: the family of the mammal;
- `Mass`: the characteristic mass of the mammal in kg;
- `Speed`: the characteristic maximal running speed of the mammal in km/hr.

The `rodent` dataset in the **rpanel** package is a subset of these data.

References

Garland, T. (1983). The relation between maximal running speed and body mass in terrestrial animals. Journal of the Zoological Society of London, 199, 155-170.

Examples

```
## Not run:
if (require(ggplot2, quietly = TRUE)) {
  ggplot(mammal_speed, aes(log(Mass), log(Speed), col = Family)) + geom_point()
}

## End(Not run)
```

poisons *Survival times of animals subjected to different poisons and treatment*

Description

These data record the survival times (in units of 10 hours) of animals in a 3 x 4 factorial experiment. Four animals were allocated to each combination of three poisons and four treatments, using a randomisation procedure.

The data are used in the `rp.anova` example script.

The data were reported in the paper by Box and Cox (1964) referenced below.

Note that from version 1.1.6 of the package, the poisons are treatments are defined as factors rather than as simple codes.

References

Box, GEP and Cox, DR (1964), An analysis of transformations. Journal of the Royal Statistical Society Series B - Statistical Methodology, 26, 211-252.

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  with(poisons, {
    rp.anova(1/stime, treatment, poison)
  })

## End(Not run)
```

river *Temperature and DO threshold in the River Clyde*

Description

These data record the water temperature at a sampling station on the River Clyde, together with an indicator of whether (1) or not (0) the concentration of dissolved oxygen fell below the threshold of 5 percent.

The data are used in the `rp.logistic` example script.

The data were kindly provided by the Scottish Environment Protection Agency, with the assistance of Dr. Brian Miller.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  rp.logistic(river$Temperature, river$Low)

## End(Not run)
```

---

rodent *The mass and speed of quadrupedal rodents*

Description

In an investigation of the relationship between mass (kg) and speed (km/hr) in mammals, Garland (1983) collected information from published articles on these two variables for a large number of different species. These measurements are given below for a variety of four-footed rodents. (The common names of the species are taken from Corbet & Hill (1986).) Notice that the measurements are not all recorded to the same level of accuracy since the results have been collated from the work of a number of different scientists.

References

Bowman, A.W. & Robinson, D.R. (1990). Introduction to Regression and Analysis of Variance: a computer illustrated text. Bristol: Adam Hilger.

Garland, T. (1983). The relation between maximal running speed and body mass in terrestrial animals. Journal of the Zoological Society of London, 199, 155-170.

Corbet, G.B. & Hill, J.E. (1986). A World List of Mammalian Species. 2nd edition. London: British Museum, Natural History.

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   with(rodent, {
     rp.regression(log(Mass), log(Speed))
   })

## End(Not run)
```

rp.ancova *Interactive analysis of covariance*

Description

This function plots a response variable against a covariate, with different groups of data identified by colour and symbol. It also creates a panel which controls the model which is fitted to the data and displayed on the plot.

The function is superseded by rp.lm which is strongly recommended as it has a more flexible interface and improved plotting, using ggplot.

Usage

```
rp.ancova(x, y, group, panel = TRUE, panel.plot = TRUE, model = NA,
          xlab, ylab, glab, hscale = NA, vscale = hscale, style = 'ggplot')
```

Arguments

x	a vector of covariate values.
y	a vector of response values.
group	a vector of group indicators. If this is not already a factor it will be converted into one.
panel	a logical variable which determines whether a panel is created to allow interactive control of the fitted models.
panel.plot	a logical parameter which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE)
model	a character variable which determines the model to be fitted. Valid values are 'None', 'Single line', 'Parallel lines', 'Different lines'.
xlab	a character variable used for the covariate axis label.
ylab	a character variable used for the response axis label.
glab	a character variable used for the group variable label.
hscale, vscale	scaling parameters for the size of the plot when panel.plot is set to TRUE. The default values are 1.
style	a character variable used to determine whether the style of the plot. When this is set to 'ggplot' the rp.lm function is called. For any other setting, a simpler display using standard graphics is created.

Details

The rp.lm function provides an alternative means of creating the display, based on model formulae.

The 'ggplot' style is strongly recommended as in this case the rp.lm function is called. The older style of display has very limited functionality.

Static plots, for printing or other purposes can be created by setting the panel argument to FALSE and specifying the model of interest.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   with(gullweight, {
     rp.ancova(hab, weight, month)
   })

## End(Not run)
```

`rp.anova` *Interactive analysis of variance*

Description

This function plots response data, separated by one or two factors. It also creates a panel which controls the models which can be fitted to the data and displayed on the plot. A comparison model can also be selected and the results of an F-test are displayed graphically.

The function is superseded by `rp.lm` which is strongly recommended as it has a more flexible interface and improved plotting, using `ggplot`. The `rp.anova` function is likely to be dropped in a future release of the `rpanel` package.

Usage

```
rp.anova(y, x, z, model = NA, model0 = NA, ylab = NA, xlab = NA, zlab = NA, title = NULL,
         lines = TRUE, panel = TRUE, panel.plot = TRUE, hscale = 1.3,
         vscale = hscale / 1.3)
```

Arguments

`y`	a vector of response values.
`x`	a factor which splits `y` into different groups.
`z`	an optional second factor which splits `y` into a second set of groups.
`model`, `model0`	logical vectors of length 2 or 4, for one or two factors respectively, defining the initial and comparison models to be fitted. For one factor, the two values determine whether each of the terms for the intercept and `x` appear. For two factors, the four values determine whether each of the four terms intercept, `x`, `z` and `x:z` appear.
`ylab`	a character name used for the response variable.

xlab	a character name used for the first factor.
zlab	a character variable used for the response axis label.
title	a character variable supplying a title. (This is used only in the case where panel is FALSE.)
lines	a logical variable which determines whether lines are drawn to connect the estimated means for each group. This can be helpful in highlighting the relative positions of the means across the groups.
panel	a logical variable which determines whether a panel is created to allow interactive control of the fitted models.
panel.plot	a logical parameter which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
hscale, vscale	scaling parameters for the size of the plot when panel.plot is set to TRUE.

Details

The data are displayed as points superimposed on a density strip created by the **ggplot2** package. Selected models are displayed through the fitted values for each group. When a valid comparison model is selected, its fitted values are displayed along with a shaded regions expressing the contribution of the differences between the two sets of fitted values to the F-statistic. The F-test is displayed in graphical form with a density strip to represent the F-distribution and a point to indicate the observed value of the F-statistic.

Static plots, for printing or other purposes can be created by setting the panel argument to FALSE and specifying the models of interest.

Value

When the function is called in interactive mode, the tcltk panel object is returned, otherwise the ggplot object containing the requested plot is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   with(poisons, {
     rp.anova(1/stime, treatment, poison)
   })

## End(Not run)
```

rp.block *Blocks use of the R console until a panel is closed*

Description

This function prevents the R console from accepting further input waits until a panel is closed. The function has two uses. The first is to keep R active when an R script is run in batch mode. This prevents the R session from terminating until the panel has been closed. The second use is to block the user from further use of the command prompt. There may be circumstances in which it is helpful to do this.

Usage

```
rp.block(panel)
```

Arguments

panel	the panel whose closure will lead to termination of rp.block.

Details

rp.block should usually be the very last function executed in a script, to prevent termination until the panel has been closed.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package (https://www.maths.gla.ac.uk/~adrian/rpanel/)

See Also

rp.control

Examples

```
## Not run:
# This function will be called on pressing the button "Simulate".
boxp.sim <- function(panel) {
  boxplot(rnorm(50))
  panel
}
# Create an rpanel and add the button "Simulate" to it.
panel <- rp.control()
rp.button(panel, action = boxp.sim, title = "Simulate")
rp.block(panel)
```

```
## End(Not run)
```

`rp.bubbleplot` *Animated scatterplot*

Description

This function produces a scatterplot of two variables, with the values of third and fourth variables represented by size and colour of the plotted points. In addition, the scatterplot is animated over a fifth variable, such as time.

Usage

```
rp.bubbleplot(x, y, year, size, col, col.palette = topo.colors(20),
                  interpolate = FALSE, fill.in = FALSE, labels = rownames(x),
                   hscale = 1, vscale = hscale)
```

Arguments

`x`	a matrix of values, whose columns correspond to time points, to be plotted on the horizontal axis.
`y`	a matrix of values, whose columns correspond to time points, to be plotted on the vertical axis.
`year`	a vector of values, usually years, over which the scatterplot will be animated. The values in this vector correspond to the columns of `x` and `y`.
`size`	a vector or matrix of values used to scale the sizes of the plotted points.
`col`	a vector or matrix of values which will be translated into the colours of the plotted points.
`col.palette`	the colour palette used to colour the points.
`interpolate`	a logical variable controlling whether interpolation is used to create data for plotting at year values which do not correspond to an exact values of `year`.
`fill.in`	a logical variable which controls whether gaps resulting from missing data are filled in with the largest previous value.
`labels`	the labels of the plotted points, used to highlight individual points on the scatterplot.
`hscale, vscale`	scaling parameters for the size of the plot when `panel.plot` is set to `TRUE`.

Details

This plot mimics the plots made famous by Hans Rosling through the Gapminder project (see https://www.gapminder.org). The aim of this function is to make this type of plot available directly from within R. The controls provide a slider or button for animation, plus a list of country names for individual identification.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.bubbleplot(log(gdp), log(co2.emissions), 1960:2007, size = population,
      col = life.expectancy, interpolate = TRUE)

## End(Not run)
```

---

rp.button *Button control for rpanel*

Description

This function adds a button to the panel. A nominated function is called when the button is pressed.

Usage

```
rp.button(panel, action = I, title=deparse(substitute(action)), repeatdelay=0,
  repeatinterval=0, quitbutton=FALSE, pos=NULL, foreground=NULL,
  background=NULL, font=NULL, parentname=deparse(substitute(panel)),
  name=paste("button", .nc(), sep=""), ...)
```

Arguments

panel	the panel in which the button should appear.
action	the function executed when the button is pressed.
title	the text displayed on the button.
repeatinterval	the interval between auto-repeats (milliseconds) when the button is held down.
repeatdelay	the time after which the button starts to auto-repeat (milliseconds).
quitbutton	this defaults to FALSE. Set to TRUE this creates a button which will close the window and escape from an rp.block call. Before the window is destroyed the action function will be called.
pos	the layout instructions. Please see the rp.pos example and help for full details.
foreground	this sets the colour of text e.g. "navy"
background	this sets the background colour of text e.g. "white"
font	this sets the text font e.g. "Arial"
parentname	this specifies the widget inside which the button should appear.
name	the name of the button.
...	...

Details

Setting `repeatinterval` and `repeatdelay` to positive values has the effect of call the function repeatedly when the button is held down.

The function `action` should take one argument, which should be the panel. See `rp.grid` for details of the grid layout system.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

Note

The arguments `id` and `parent` have been discontinued in version 1.1.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.doublebutton`,`rp.control`

Examples

```
## Not run:
   # This function will be called on pressing the button "Simulate".
   boxp.sim <- function(panel) {
     boxplot(rnorm(50))
     panel
     }
   # Create an rpanel and add the button "Simulate" to it.
   panel <- rp.control()
   rp.button(panel, action = boxp.sim, title = "Simulate")

## End(Not run)
```

---

rp.cartoons *Access to a collection of rpanel illustrations*

Description

This function creates a panel with a menu which launches a variety of rpanel illustrations. The function provides a template which can be amended by users to create tailored sets of illustrations.

Usage

```
rp.cartoons(hscale = 1)
```

Arguments

hscale	a scaling parameter for the size of the plot which will be passed to all relevant menu items.

Value

Nothing.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.cartoons()

## End(Not run)
```

---

rp.checkbox *A checkbox control for rpanel*

Description

Adds one or more checkboxes to the panel, to control logical variables.

Usage

```
rp.checkbox(panel, variable, action=I, labels=NULL, names=NULL, title=NULL,
  initval=rep(FALSE, length(labels)), pos=NULL, doaction=FALSE, foreground=NULL,
  background=NULL, font=NULL, parentname=deparse(substitute(panel)),
  name=paste("checkbox", .nc(), sep=""), ...)
```

Arguments

panel	the panel in which the checkbox(es) should appear.
variable	the name of the variable within the panel that the checkbox(es) should control.
action	the function to call whenever a checkbox is clicked.
labels	the labels of the checkboxes. The length of labels determines the number of checkboxes created. This default value for labels is the name of variable, and therefore a single checkbox.
names	the names attached to the elements of variable. These provide a helpful means of referring to particular items in multiple checkboxes when defining the action function. If names were not specified in the call to rp.control then names is set to labels.

title	the title of the checkbox group. This defaults to the name of the variable variable.
initval	the initial value for variable (optional). The initial value can also be specified in the call to rp.control.
pos	the layout instructions. Please see the rp.pos example and help for full details.
doaction	a logical variable which determines whether the action function is called when the widget is created. The default is FALSE, so that the rp.do function should be called after all widgets have been created, to initialise the state of the panel display.
foreground	this sets the colour of text e.g. "navy"
background	this sets the background colour of text e.g. "white"
font	this sets the text font e.g. "Arial"
parentname	this specifies the widget inside which the checkbox(es) should appear.
name	the name of the checkbox.
...	...

Details

The function action should take one argument, which should be the panel to which the checkbox is attached. See rp.grid for details of the grid layout system.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.radiogroup,rp.control

Examples

```
## Not run:
   plot.hist <- function(panel) {
  with(panel, {
  xlim <- range(c(x, mean(x) + c(-3, 3) * sd(x)))
    if (panel$cbox[3])
       clr <- "lightblue" else clr <- NULL
    hist(x, freq = FALSE, col = clr, xlim = xlim)
    if (panel$cbox[1]) {
       xgrid <- seq(xlim[1], xlim[2], length = 50)
       dgrid <- dnorm(xgrid, mean(x), sd(x))
       lines(xgrid, dgrid, col = "red", lwd = 3)
       }
```

```
    if (panel$cbox[2])
       box()
    })
  panel
  }
   x <- rnorm(50)
   panel <- rp.control(x = x)
   rp.checkbox(panel, cbox, plot.hist,
      labels = c("normal density", "box", "shading"), title = "Options")
   rp.do(panel, plot.hist)

## End(Not run)
```

`rp.ci` *Simulations of normal-based confidence intervals*

Description

This function shows simulated confidence intervals for the mean of a normal distribution. It also creates a panel which controls the mean and standard deviation of the population and the size of the simulated sample.

Usage

```
rp.ci(mu = 0, sigma = 1, sample.sizes = c(30, 50, 100, 200, 500),
      confidence = 0.95, panel = TRUE,
      panel.plot = TRUE, hscale = NA, vscale = hscale)
```

Arguments

`mu`, `sigma`	the population mean and standard deviation.
`sample.sizes`	the available sample sizes (`30`, `50`, `100`, `200`, `500`) for simulated data.
`confidence`	the available confidence levels (`0.90`, `0.95`, `0.99`).
`panel`	a logical value determining whether an interactive panel is created or a static display is produced.
`panel.plot`	a logical parameter, relevant to the `tcltk` case only, which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
`hscale`, `vscale`	scaling parameters, relevant to the `tcltk` case only, for the size of the plot when `panel.plot` is set to `TRUE`. The default values are 1.

Details

A button is provided to sample repeatedly from the current settings. Confidence intervals which cover the population mean are coloured blue while those which miss are coloured red. Repeated simulations illustrate the property of confidence intervals to capture the true value with probability determined by the confidence level (which here is set to 0.95).

Value

The tcltk panel object is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  rp.ci()

## End(Not run)
```

---

rp.clearlines *Remove lines from an rpanel image*

Description

This function removes line(s) from an rpanel image widget: rp.clearlines removes all the lines from an image while rp.deleteline deletes only a given line.

Usage

```
rp.clearlines(panel, imagename)
```

Arguments

panel	the panel which contains the image. This may be passed as a panelname string or the panel object itself.
imagename	the name of the image within the panel.

Value

If the parameter panel is the panelname string the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Note

In version 1.1 "id" has been renamed "name" to be consistent with the rest of rpanel.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.image,rp.line

Examples

```
## Not run:
   panel <- rp.control()
   image.file <- file.path(system.file(package = "rpanel"), "images", "gulllmks.gif")
   panel <- rp.image(panel, image.file, imagename="gulls.image")
   rp.line(panel, imagename=gulls.image, 10, 10, 100, 100, color = "green")
   rp.line(panel, imagename=gulls.image, 100, 100, 100, 10, color = "blue")
   rp.clearlines(panel, imagename=gulls.image)

## End(Not run)
```

---

rp.coefficients *Graphical display of the effects of the coefficients in a linear or generalised linear model*

Description

The effects of the coefficients of a linear or generalised linear model are displayed in graphical form. The effects are made comparable by viewing the change in the mean value of the response as each predictor variable changes across its range.

Usage

```
rp.coefficients(model, style = 'density', ci = TRUE, point.estimate = !ci,
                 se.scale = FALSE, marks, cols, ngrid)
```

Arguments

model	a linear or generalised linear model produced by the lm or glm functions.
style	a character variables controlling whether effect uncertainties are displayed as densities ('density') or shaded density strips ('shading.')
ci	a logical value controlling whether uncertainty is placed around the estimated effect in confidence interval style or around 0 in the format of a hypothesis test.
point.estimate	a logical value controlling whether the estimated effect is displayed as a point estimate.
se.scale	a logical value controlling whether a standard error scale is superimposed on the uncertainty display.
marks	a vector of reference values to be highlighted on the standard error scale. If this is not supplied then the upper and lower 2.5% quantiles of a t-distribution will be used in the case of linear models and +/-1.96 for generalised linear models.

cols	a named character vector of colours to be used in the display. If this is not specified then the colours defined by the **rpanel** package function rp.colours are used. The colours can be altered by setting the cols argument to a vector of colours, assigned according to the names of the vector.
ngrid	the number of grid points used in the construction of the uncertainty display. If not supplied, this will be set to 200.

Details

The covariate range information is added to the labels by the function.

When coefficient labels are lengthy, or there are many coefficients in the model, some overlapping may occur. Options to deal with this are shown in the examples below.

Value

A ggplot object is returned. This allows further annotation of the display.

Examples

```
## Not run:
   model <- lm(Giving ~ Employ + Elect + Attend + 1, data = CofE)
   rp.coefficients(model)

   # Change colours

   # Options for labelling
   plt <- rp.coefficients(model)
   plt + ggplot2::theme(axis.text.x = ggplot2::element_text(angle = 90))
   plt + ggplot2::scale_x_discrete(labels = scales::label_wrap(5))
   plt + ggplot2::coord_flip()

## End(Not run)
```

---

rp.colour.key *Creates a colour key.*

Description

A colour key is created using the specified colours (cols) and an axis defined by the specified breaks (brks). This is usually an additional component of a panel which allows the colours on the main plot to be interpreted. The function is used in that way in the function rp.plot4d.

Usage

```
rp.colour.key(cols, brks, par.mar = c(5, 0, 4, 3) + 0.1,
natural = TRUE, cex = 1, margin = FALSE)
```

Arguments

cols	a vector of colours.
brks	a vector of values which defines the positions on the axis between which each colour is placed.
par.mar	a vector of four values which are passed to the mar argument of the par function to control the marginal space around the key.
natural	a logical value which, when TRUE, causes the usual form of axis to be constructed from the values in brks. When natural is FALSE, the values in brks are associated with a regularly spaced set of locations along the axis.
cex	a numerical value with default 1 which allows the size of axis labels to be altered.
margin	a logical value which determines whether a marginal plotting area is placed on the left of the key. This can be useful in allowing relevant information to be plotted alongside the key, such as the confidence intervals in rp.surface. Specifically, if margin is FALSE, the horizontal axis has range c(0, 1) while if margin is TRUE the the range is c(-1, 1). In both cases the key is plotted over the horizontal range c(0, 1).

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  key.plot <- function(panel) {
   rp.colour.key(topo.colors(12), 0:12)
   panel
  }
  panel <- rp.control()
  rp.tkrplot(panel, key, key.plot, hscale = 0.15)

## End(Not run)
```

---

rp.colours *Specify the colours to be used in some* **rpanel** *functions.*

Description

Returns a named vector specifying the colours to be used in some **rpanel** functions. Where colours for particular purposes are not specified default values are returned.

Usage

```
rp.colours(cols)
```

Arguments

cols	a named vector of colours.

Details

Some **rpanel** functions have a cols argument which can be used to specify the colours used when creating some aspects of the resulting visual display. The rp.colours function is used internally to set these colours, altered where appropriate by the elements of cols. Users need not employ this function, except to view the default colours.

Value

A named vector of the colours.

Examples

```
## Not run:
# View the defauklt colours.
rp.colours()

# Alter particular colours
model <- lm(Giving ~ Attend + Employ, data = CofE)
rp.coefficients(model)
rp.coefficients(model, cols = c('estimate' = 'darkgreen'))

## End(Not run)
```

---

rp.combo *A 'combo' for a panel*

Description

This function adds a 'combobox' to the panel. When an item is pressed, a variable is set and an action function is called.

Usage

```
rp.combo(panel, variable, prompt=NULL, vals, initval=vals[1], pos=NULL, action=I,
  foreground=NULL, background=NULL, font=NULL, editable=FALSE,
 parentname=deparse(substitute(panel)), name=paste("combo", .nc(), sep=""), ...)
```

Arguments

panel	the panel in which the combobox should appear.
variable	the name of the variable whose value is set by the combobox.
prompt	the label for the combobox.
vals	the values of variable used by the combo.

initval	the initial value of variable (optional). The initial value can also be specified in the call to rp.control.
pos	the layout instructions. Please see the rp.pos example and help for full details.
action	the function which is called when an item is chosen.
foreground	colour of the text
background	colour of the text background
font	font to be used
editable	whether the combobox can be edited or not.
parentname	this specifies the widget inside which the combobox should appear.
name	name assigned to the combobox, used for disposing of the widget
...	...

Details

The function action should take one argument, which should be the panel to which the combobox is attached.

See rp.grid for details of the grid layout system.

This function makes use of the BWidget extension to the Tcl/Tk system. If Bwidget has not been installed on your system, download it from https://sourceforge.net/projects/tcllib/files/BWidget/ and expand the compressed file into a folder. On a Windows machine, this folder should then be copied into the folder containing the Tcl libraries that were installed as part of R. This may be in a location such as C:\Program Files\R\R-4.0.2\Tcl\lib (with an obvious change to the version number of R being used). On a Mac, the downloaded folder should be copied into the folder where the main Tcl package is located (note: not inside the Tcl folder but at the same level as the Tcl folder). This may be in a location such as /usr/local/lib.

Note that rp.listbox provides an alternative to rp.combo if the latter is unavailable.

Value

If the parameter panel is the panelname string the same string is returned. If the panel object is used the altered panel is assigned to both the calling level and panel's environment level.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

Note

Parameters parent and ... have been discontinued in version 1.1. Note that the argument previously named var has been renamed variable to avoid reserved word issues.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.checkbox, rp.control

Examples

```
## Not run:
   callback <- function(panel) {
      print(panel$option)
      panel
   }
   panel <- rp.control()
   rp.combo(panel, option, "Pick an option:",
            c("Option1","Option2","Other options"), action=callback)

## End(Not run)
```

---

rp.contingency *Visualisation of two-way contingency tables with uncertainties*

Description

A two-way contingency table is displayed graphically and the uncertainties associated with a chi-squared test may be visualised.

Usage

```
rp.contingency(x, uncertainty = 'none', proportion.scale = 'fixed', cols)
```

Arguments

x	a two-way table or matrix of observed counts.
uncertainty	a character value which controls whether uncertainties are displayed for each cell, in 'shading' or 'violin' style.
proportion.scale	a character value specifying whether the proportion scale is 'fixed' or 'free'.
cols	a named vector of characters specifying colours to be used in the plot. See help(rp.colours) for details.

Details

The table is displayed in a form which stratifies by columns. If it more appropriate to stratify by the rows of x then the function may be applied to t(x).

The uncertainties associated with each cell are based on the standard errors associated with standardised residuals. See the help file for chisq.test for details.

Missing data are not allowed.

Examples

```
## Not run:
   x <- matrix(c(19, 41, 32, 28), ncol = 2,
            dimnames = list(c("non-smoker", "smoker"),
                            c("cases", "controls")))
   rp.contingency(x)
   rp.contingency(x, style = "aligned")
   rp.contingency(x, uncertainty = TRUE)
   rp.contingency(x, uncertainty = TRUE) + ggplot2::coord_flip()

## End(Not run)
```

`rp.control` *Create or dispose of an rpanel*

Description

The function `rp.control` creates a panel window into which rpanel widgets can be placed. It can also set up variables within the rpanel object. The function `rp.control.dispose` disposes of an rpanel.

Usage

```
rp.control(title = "", size = c(100, 100), panelname, background, ...)
rp.control.dispose(panel)
```

Arguments

`title`	the title of the panel displayed in the banner.
`size`	a two-element numeric vector specifying width and height of the panel in pixels. If this argument is omitted the size of the panel will adapt to the subsequent addition of widgets.
`panelname`	the name of the panel. It is usually not necessary to set this as it will be given a name automatically.
`background`	the background colour of the control e.g. "white". (New parameter with version 2.0.)
`...`	additional arguments which are treated as variable initialisations and are stored within the returned rpanel object. For example inserting `x=3` creates a variable `x` in the rpanel object with the value 3. Note that the names of these additional arguments should not conflict with those of the main arguments of `rp.control`.
`panel`	the panel to be disposed of. This represents the object and its parameters

Details

Objects passed into `rp.control` are then available to be used by action functions.

Value

The list object which defines the panel.

Note

Previous arguments `realname` and `aschar` have been discontinued in version 1.1.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.button`, `rp.checkbox`, `rp.combo`, `rp.doublebutton`, `rp.grid`, `rp.image`, `rp.listbox`, `rp.menu`, `rp.radiogroup`, `rp.slider`, `rp.text`, `rp.textentry`, `rp.tkrplot`, `rp.widget.dispose`

Examples

```
## Not run:
   hist.or.boxp <- function(panel) {
     if (panel$plot.type == "histogram")
       hist(panel$x)
     else
       boxplot(panel$x)
     panel
   }
   panel <- rp.control(x=rnorm(50), panelname="panel")
   rp.radiogroup(panel, plot.type, c("histogram", "boxplot"),
                 title="Plot type", action = hist.or.boxp)

   # Try also
   # panel <- rp.control()
   # rp.control.dispose(panel)

## End(Not run)
```

---

rp.control.put *Updates the panel environment with the current value of the panel list object.*

Description

Sometimes an action function makes changes to the panel list object. When the action function is completed, the panel environment is updated. However, if there are other calls to action functions within the original action function, then the panel environment needs to be updated before these calls. This function achieves that.

Usage

```
rp.control.put(panelname, panel)
```

Arguments

panelname	the panelname of the relevant panel. This is usually identified as panel$panelname.
panel	the relevant panel.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.control

Examples

```
## Not run:
  action1 <- function(panel) {
    panel$x <- rnorm(1)
    rp.control.put(panel$panelname, panel)
    rp.do(panel, action2)
    panel
  }
  action2 <- function(panel) {
   print(panel$x)
   panel
  }
  panel <- rp.control(x = 0)
  rp.button(panel, action1, "new x")

## End(Not run)
```

---

rp.datalink *Links for datasets*

Description

Links to specific remote datasets are provided. These can be read from the source locations or downloaded to a local directory for convenience.

Usage

```
rp.datalink(name, action = "retrieve filename")
```

Arguments

name	When action = "set local directory", this should be a single character string giving the location of the local directory to be used for downloading datasets. When action = "download", this should be a character vector of dataset names for downloading to the local directory. The special case name = "all" will download all datasets. When action = "retrieve filename", this should be a single character string giving the name of the dataset whose location is required.
action	a character string taking the values "set local directory", "download" or "retrieve filename". The actions performed by these settings are indicated in the description of the name argument above.

Details

Calling the function with no arguments, as rp.datalink(), will print the dataset names, the file extensions and the remote link.

When action = "retrieve filename" but the file has not been downloaded to a local directory, the file is downloaded to a temporary file and the name of this temporary file is returned.

The specification of the local directory can be removed by setting the name argument to NULL.

The file associated with 'name' can be a zip file, in which case the unz function can be used to locate the specific file of interest. The Examples below illustrate this. Some functions to read data require a specific path to the file of interest, rather than a connection. In this case, the unzip function can be used to unzip the files to a temporary (using tempdir) or other specified directory first.

Value

If the function is called with no arguments, the dataset names, the file extensions and the remote link re returned in a dataframe. If action = "set local directory", the name of the local directory is returned. When action = "download", the names of the local files created are returned. When action = "retrieve filename", the location of the specified dataset is returned.

Examples

```
## Not run:
  rp.datalink()
  rp.datalink("~/Desktop/temp", "set local directory")
  rp.datalink("global_temperature")

  # Reading from a file within a zip file
  zfile   <- rp.datalink("children_services")
  dirname <- "Data and Code CSRR Strand 3 - August 2023 Update"
  path <- unz(zfile, paste(dirname, "Example_Indicator_CSR.csv", sep = "/"))
  if (!requireNamespace("readr", quietly = TRUE))
    indicator <- read_csv(path, skip = 6, col_names = c("LA", 2011:2021))

## End(Not run)
```

`rp.deleteline` *Removes a line from an rpanel image*

Description

This removes a previously drawn line which was given an id in rp.line.

Usage

```
rp.deleteline(panel, imagename, id)
```

Arguments

`panel`	the panel containing the image. This may be passed as a panelname string or the panel object itself.
`imagename`	the image on which the line was drawn.
`id`	the identifier of the line to be deleted.

Value

If the argument `panel` is the panelname string the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Note

In version 1.1, the former argument `image` has been renamed `name` to be consistent with the rest of **rpanel**.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   panel <- rp.control()
   image.file <- file.path(system.file(package = "rpanel"), "images", "gulllmks.gif")
   panel <- rp.image(panel, image.file, imagename="gulls.image")
   rp.line(panel, imagename=gulls.image, 10, 10, 100, 100, color = "green", id="first")
   rp.line(panel, imagename=gulls.image, 100, 100, 100, 10, color = "blue", id="second")
   rp.deleteline(panel, imagename=gulls.image, id="first")

## End(Not run)
```

rp.do *Runs a user-written action function*

Description

Runs a user-written action function, passing a panel to it as a parameter. This can be used to put the rpanel into its initial state. For example, it is useful when using radiobuttons as these do not automatically call the action function when the controls are first created.

Usage

```
rp.do(panel, action, x = NA, y = NA)
```

Arguments

panel	the panel to be passed as a parameter to the function.
action	the function to be executed.
x, y	additional arguments for mouse position on the plot, so that the action function can be called with these additional arguments if they are present.

Value

If the argument panel is the panelname string the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.radiogroup

Examples

```
## Not run:
   data.plotfn <- function(panel) {
     if (panel$plot.type == "histogram")
       hist(panel$x)
     else
       if (panel$plot.type == "boxplot")
         boxplot(panel$x)
       else
         plot(density(panel$x))
     panel
   }
   panel <- rp.control(x = rnorm(50))
```

```
   rp.radiogroup(panel, plot.type,
          c("histogram", "boxplot", "density estimate"),
          action = data.plotfn, title = "Plot type", initval="histogram")
   rp.do(panel, data.plotfn)

## End(Not run)
```

`rp.doublebutton` *Double-button widget for rpanel*

Description

Adds a control with '+' and '-' buttons, to increment and decrement a variable.

Usage

```
rp.doublebutton(panel, variable, step, title=deparse(substitute(variable)),
                action=I, initval=NULL, range=c(NA, NA), log=FALSE,
                showvalue=FALSE, showvaluewidth=4, repeatinterval=100,
                repeatdelay=100, pos=NULL, foreground=NULL,
              background=NULL, font=NULL, parentname=deparse(substitute(panel)),
                name=paste("doublebutton", .nc(), sep=""), ...)
```

Arguments

`panel`	the panel in which the doublebutton should appear.
`variable`	the name of the variable within the panel that the doublebutton should control.
`step`	the value by which the variable "variable" is incremented or decremented on pressing a button. When log is TRUE this is a factor instead.
`title`	the label for the doublebutton. This defaults to the name of var.
`action`	the function which is called when a button is pressed.
`initval`	the initial value for var (optional). The initial value can also be specified in the call to `rp.control`.
`range`	a 2-element numeric vector containing lower and upper limits for var. Use NA for no limit (upper and/or lower).
`log`	a logical variable which determines whether the increment (step) is multiplicative or additive.
`showvalue`	a logical variable which determines whether the present value of "variable" is shown between the + and - buttons. This is forced to FALSE when log is TRUE.
`showvaluewidth`	defines the width of the shown value in characters.
`repeatinterval`	the interval between auto-repeats (milliseconds) when the button is held down.
`repeatdelay`	the time after which the button starts to auto-repeat (milliseconds).
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`foreground`	colour of the text

background	colour of the text background
font	font to be used
parentname	this specifies the widget inside which the doublebutton widget.
name	name assigned to the doublebutton; used for disposal etc
...	...

Details

action should be a function of one argument, which should be the panel. The panel can then be manipulated, and data stored in the panel may be used/modified, then the (optionally modified) panel must be returned.

See rp.grid for details of the grid layout system.

Value

If the argument panel is the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

Note that setting log=TRUE and showvalue=TRUE is not allowed.

Note

The former arguments parent and ... have been discontinued in version 1.1. Note also that the argument var has been renamed variable to avoid reserved word issues.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.radiogroup,rp.control

Examples

```
## Not run:
   density.draw <- function(panel) {
     plot(density(panel$x, bw = panel$h))
     panel
     }
   panel <- rp.control(x = rnorm(50))
   rp.doublebutton(panel, var = h, step = 0.05,
     title = "Density estimate", action = density.draw,
     range = c(0.1, 5), initval=1)
```

```
## End(Not run)
```

`rp.drop1` *Display in graphical form the results of dropping all single terms from a model.*

Description

Plot the results, in terms of F-tests, of dropping all individual terms from a linear model. This is essentially a graphical display of the results from the function `drop1`. The hierarchy of the model formula is respected so that when interaction terms are present main effect terms are not considered.

Usage

```
rp.drop1(model, subset.terms, p.reference = c(0.05, 0.01), cols)
```

Arguments

`model`	a linear model produced by the `lm` function.
`subset.terms`	a character vector containing the names of the subset of terms to be examined.
`p.reference`	a numeric vector specifying the p-values for which the positions on the F-value scale will be marked.
`cols`	a named vector of colours to be used in the construction of the plot. See `help(rp.colours)` for details. The relevant name for `rp.drop1` is `'reference'`.

Details

The `rp.colours` function is used internally to set these colours, altered where appropriate by the elements of `cols`. Users need not employ this function, except to view the default colours.

The **ggplot2** package is required by this function. If the **ggforce** is available, this is used to scale the heights of facet rows when there are multiple terms with different degrees of freedom.

Value

A `ggplot` object containing the plot.

Examples

```
## Not run:
model <- lm(Giving ~ Attend + Employ, data = CofE)
rp.drop1(model)

## End(Not run)
```

`rp.firth` *Geostatistical sampling and analysis simulation tool*

Description

This function gives access to a sampling scenario which is based on the mapping of radioactivity and the calculation of a radionuclide inventory within a water body. (A 'firth' is a Scottish term for a long, narrow indentation of the sea coast at the mouth of a river.) Interest lies in nuclides which, on release into a water body, attach (absorb) to sediment in a manner which depends on the sediment particle size. Cobalt-60 and caesium-137 are examples of nuclides which exhibit this behaviour. In this sampling scenario, the map of sediment type is used to define regions of different particle size from which the sediment samples will be collected by grabs from a boat. The presence of strata therefore has to be considered, as the different types of material on the sea bed may affect the mean values of the measurements taken.

The function displays a map and gives graphical control over a variety of sampling strategies. Once the user has drawn a sample, some simple predictions over the whole firth can be produced. The **geoR** package is used to construct these predictions.

Usage

```
rp.firth(hscale = NA, col.palette = rev(heat.colors(40)), col.se = "blue", file = NA,
          parameters = NA)
```

Arguments

`hscale`	a scaling parameter which expands (>1) or contracts (<1) the size of the plot within the panel. This can be useful for projection onto a screen, for example. The vertical scale is set to the same value as the horizontal scale, to ensure that the plot is square. The default values are 1.
`col.palette`	the colour palette used to display the predicted and true spatial surfaces.
`col.se`	the colour used to draw the standard error contours on the predicted surface.
`file`	the name of a file to which the sampled data will be written.
`parameters`	a list which can be used to change the parameters which control the simulated measurement data.

Details

The use of the function is discussed in detail in the paper by Bowman et al. (2008) referenced below.

Once the data have been sampled, a data file may be saved for further analysis external to the `rp.firth` function, using the `file` argument. A convenient way of saving to the current working directory, for example to a file named `firth.dmp`, is to set the `file` argument to `file.path(getwd(), "firth.dmp")`. The `load` function can then be applied to the saved file to create an object called `mururoa.data`, which is a three-column matrix with the x and y locations in columns 1 and 2 and the observed values in column 3.

Value

Nothing in returned.

References

Bowman, A.W., Crawford, E., Alexander, G. Gibson and Bowman, R.W. (2007). rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Bowman, A.W., Gibson, I., Scott, E.M. and Crawford, E. (2008). Interactive Teaching Tools for Spatial Sampling. Journal of Statistical Software, 36, 13, 1–17.

See Also

rp.mururoa, rp.geosim

Examples

```
## Not run:
  rp.firth()

## End(Not run)
```

---

rp.geosim *Interactive visualisation of spatially correlated random fields*

Description

This function allows Gaussian random fields to be simulated and visualised, using graphical controls for a variety of parameter settings.

Usage

```
rp.geosim(max.Range = 0.5, max.pSill = 1, max.Nugget = 1, max.Kappa = 10,
          max.aniso.ratio = 3, min.ngrid = 10, max.ngrid = 25,
          hscale = NA, vscale = hscale, smgrid = 40, ngrid = 15,
          Range = 0.1, pSill = 0.5, Nugget = 0, kappa = 4,
          aniso.angle = 0, aniso.ratio = 1,
          col.palette = terrain.colors(40), panel = TRUE)
```

Arguments

max.Range, max.pSill, max.Nugget	the maximum values of the range, sill and nugget parameters. These define the end-points of the corresponding slider scales.
max.Kappa	The maximum value of the kappa parameter in the Matern family of spatial covariance functions.

`max.aniso.ratio`
: The maximum value of the anisotropy ratio parameter, which controls the degree of anisotropy in the simulated field.

`min.ngrid`, `max.ngrid`
: the minimum and maximum values of the grid size for sampling points.

`hscale`, `vscale`
: horizontal and vertical scaling factors for the size of the plots. It can be useful to adjust these for different screen resolutions or for projection in a lecture setting. The default values are 1.

`smgrid`
: the number of grid points on each dimension of the displayed process. The default is 40.

`ngrid`
: the number of grid points in each dimension of the sampled locations. The default is 15.

`Range`, `pSill`, `Nugget`
: the initial values of the range, partial sill and nugget parameters. the defaults values are 0.1, 0.5 and 0 respectively.

`kappa`
: the initial value of the smoothness parameter of the Matern covariance function. The default is 4.

`aniso.angle`, `aniso.ratio`
: the initial values of the anisotropy angle (in radians) and and ratio parameters. The default values are 0 and 1 respectively.

`col.palette`
: the colour palette used to display the random fields.

`panel`
: a logical variable which determines whether an interactive panel is created.

Details

The aim of the tool is to allow the generation of repeated simulated fields without the distraction of re-executing code explicitly. This can help to gain an intuitive understanding of the nature of spatial data. In particular, interactive control of parameters can help greatly in understanding the meaning and effects of parameter values. Nugget effects can be added and sampled points displayed. Two-dimensional contour plots are produced. Three-dimensional plots are also produced if the **rgl** package is available.

The use of the function is discussed in the paper paper by Bowman et al. (2008) referenced below.

The **geoR** and **fields** packages are used to generate the data.

Note that the Matern covariance function is parameterised in the form described by Handcock & Wallis (1994) which separates the effects of the shape and range parameters.

Value

The `tcltk` panel object is returned.

References

Adler, D. (2005). rgl: 3D Visualization Device System (OpenGL). https://cran.r-project.org.

Bowman, A.W., Crawford, E., Alexander, G. Gibson and Bowman, R.W. (2007). rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Bowman, A.W., Gibson, I., Scott, E.M. and Crawford, E. (2008). Interactive Teaching Tools for Spatial Sampling. Journal of Statistical Software, 36, 13, 1–17.

Diggle, P.J. and Ribiero, P.J. (2008). Model-based Geostatistics. Springer, New York.

Handcock, M.S. and Wallis, J.R. (1994). An approach to statistical spatial-temporal modeling of meteorological fields. Journal of the American Statistical Association, 89, 368-378.

See Also

rp.firth, rp.mururoa

Examples

```
## Not run:
   rp.geosim()

## End(Not run)
```

---

rp.grid *Define a subsidiary grid within an rpanel*

Description

A subsidiary grid is defined at a specified location within an rpanel.

Usage

```
rp.grid(panel, name=paste("grid", .nc(), sep=""), pos=NULL, background=NULL,
  parentname=deparse(substitute(panel)), ...)
```

Arguments

panel	the panel to which the grid should be attached.
name	a string defining the name of the grid. For use with rp.widget.dispose
pos	See the help information on "grid" mode in rp.pos, for more information.
background	a character variable defining a background colour. (This is not the same as colours in R, but simple colours are available.)
parentname	this specifies the widget inside which the grid should appear.
...	...

Details

The role of this function is to specify a subsidiary grid at a particular row and column position of the parent grid. Nesting of grids within grids is permitted. See the help information on "grid" mode in rp.pos for a description of the settings of the pos argument.

Note

The former argument `parent` has been discontinued in version 1.1, while the argument bg has been renamed `background` for consistency with the other functions.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
panel <- rp.control()
rp.grid(panel, pos=list(row=0, column=0, sticky="news"),
        background="red", name="g0")
rp.grid(panel, pos=list(row=1, column=1, sticky="news", width=100, height=100),
        background="navy", name="g1")
rp.grid(panel, pos=list(row=2, column=2, sticky="news", width=150, height=200),
        background="green", name="g2")
rp.button(panel, function(panel) { panel }, "press A",
        pos=list(row=1, column=1, sticky=""), parentname="g1")
rp.button(panel, function(panel) { panel }, "press B",
        pos=list(row=2, column=2, sticky="news"), parentname="g1")
rp.button(panel, function(panel) { panel }, "press C",
        pos=list("left",width=50, height=150), parentname="g2")
rp.grid(panel, pos=list(row=0, column=0, sticky="", width=10, height=10),
        background="yellow", parentname="g0")

## End(Not run)
```

---

rp.gulls *STEPS module: the Birds and the Bees*

Description

The function launches a panel which contains an image of a herring gull. With this bird, sex cannot easily be identified by visual inspection. The user is invited to identify length measurements, defined by pairs of landmarks, which will enable males and females to be identified.

Usage

```
rp.gulls(df.name = "", panel.plot = TRUE)
```

Arguments

`df.name`	a string giving the filename where the dataframe containing the currently collected measurements will be stored using the `save` function. If this string is the default value of "" then no file will be saved.
`panel.plot`	whether to plot or not.

Details

The panel contains an image with landmarks indicated by yellow dots. When the user clicks two landmarks, a length measurement is indicated by a coloured line. The 'Collect data' button can be clicked to request that this measurement is collected, on a database of birds whose sex is known. If the measurement is a valid and useful one, it is added to the named dataframe, which is immediately saved in the file `df.name` and is therefore available for inspection and analysis simply by `load`ing this file. If the measurement is invalid or not useful, an appropriate message is given in a pop-up window.

Note that in versions of rpanel earlier than 1.1-1 the dataframe containing the collected data was previously forced into the global environment for immediate access. This has been replaced by the use of a user-nominated file.

This function does not have `hscale` and `vscale` arguments because the size of the window is determined by the resolution of the image of the gull.

Value

the name of the panel created.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  rp.gulls()

## End(Not run)
```

---

rp.image *Placement of an image within a rpanel*

Description

An image is placed inside a panel. When the image is clicked the action function is called with the x and y coordinates of the clicked position.

Usage

```
rp.image(panel, filename, imagename, action=NA, mousedrag=NA, mouseup=NA, pos=NULL,
  parentname=deparse(substitute(panel)), ...)
```

Arguments

panel	the panel in which the image should appear. This may be passed as a panelname string or the panel object itself.
filename	the name of the file where the image is located.
imagename	name assigned to the image, used for disposing of the widget
action	the function which is called when the image is clicked.
mousedrag	the function which is called when the mouse is dragged.
mouseup	the function which is called when the mouse is released.
pos	the layout instructions. Please see the rp.pos example and help for full details.
parentname	this specifies the widget inside which the image should appear.
...	...

Details

The function action should take three arguments, the panel and the coordinates x and y where the image was clicked. At present only GIF images are supported.

See rp.grid for details of the grid layout system.

Value

If the argument panel is the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

Note

The former arguments parent and ... have been discontinued in version 1.1. Note also that the argument id has been renamed name to be consistent with the rest of rpanel.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   gulls.click <- function(panel, x, y) {
     print(c(x, y))
     panel
     }
   panel <- rp.control()
   image.file <- file.path(system.file(package = "rpanel"), "images", "gulllmks.gif")
```

```
   rp.image(panel, image.file, gulls.image, action = gulls.click)

## End(Not run)
```

`rp.likelihood` *Interactive inspection of one- or two-parameter likelihood surfaces*

Description

This function plots a likelihood surface for a model with one or two parameters. It also creates a panel which allows the maximum likelihood estimate, a confidence region and other objects of interest to be added to the plot. For two-parameter models the `rgl` package is required.

Usage

```
rp.likelihood(loglik.fn, data, theta.low, theta.high, form = "log-likelihood",
                  hscale = NA, vscale = hscale)
```

Arguments

`loglik.fn`	This should be either the name of a function, with arguments `theta` and `data`, or R code, in text form, which evaluates the log-likelihood function. The latter form allows simple `R` expressions such as `sum(log(dexp(data, theta)))` or `sum(log(dgamma(data, theta[1], theta[2])))` to be used to define the log-likelihood.
`data`	an object which contains the data. This will be referred to in `likelihood contributions`.
`theta.low`	a vector of length one or two which defines the lower limit(s) of the parameter values for initial plotting.
`theta.high`	a vector of length one or two which defines the upper limit(s) of the parameter values for initial plotting.
`form`	a text variable which determines whether the likelihood or log-likelihood function is to be plotted. This applies only to one-parameter models. With two-parameter models, only the log-likelihood is plotted.
`hscale, vscale`	scaling parameters for the size of the plot when there is one covariate. The default values are 1.

Details

The interactive controls allow a variety of aspects of the plots to be altered. This is intended to allow students and lecturers to explore likelihood surfaces in a manner which promotes an intuitive understanding of the concepts involved.

In the case of one parameter, the vertical axes of the (log-)likelihood plot can be clicked and grabbed to alter the plotting region interactively. This can be useful, in particular, in identifying the maximum likelihood estimator graphically.

Value

Nothing is returned.

References

rpanel: Statistical cartoons in R. MSOR Connections, 7, 3-7.

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.likelihood("sum(log(dexp(data, theta)))", aircond, 0.005, 0.03)
   rp.likelihood("sum(log(dgamma(data, theta[1], theta[2])))",
        aircond, c(0.3, 0.005), c(3, 0.06))

## End(Not run)
```

---

rp.line *Draws a line on an rpanel image*

Description

This draws a line connecting the pixel locations `x1, y1` to `x2, y2` on the specified image. The colour and width of the line can be controlled.

Usage

```
rp.line(panel, imagename, x1, y1, x2, y2, color = "black", width = 2, id = 'rpline')
```

Arguments

`panel`	the panel containing the image. This may be passed as a panelname string or the panel object itself.
`imagename`	the image on which the line should be drawn.
`x1`	the horizontal first position of start of the line in pixel co-ordinates.
`y1`	the vertical first position of start of the line in pixel co-ordinates.
`x2`	the horizontal final position of end of the line in pixel co-ordinates.
`y2`	the vertical final position of end of the line in pixel co-ordinates.
`color`	the colour of the line. The default is "black".
`width`	the width of the line. The default is 2.
`id`	the identifier of the line created.

Details

The function `action` should take one argument, which should be the panel to which the line is attached.

Value

If the argument panel is the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Note

In version 1.0, the former argument `image` has been renamed `name` to be consistent with the rest of rpanel.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.tkrplot`,`rp.image`

Examples

```
## Not run:
  click.capture <- function(panel,x,y) {
    if (is.null(panel$x)) {
      panel$x <- as.numeric(x)
      panel$y <- as.numeric(y)
    }
    else {
      rp.line(panel, imagename=gulls.image, panel$x, panel$y,
              as.numeric(x), as.numeric(y), width=3, id = "current")
      panel$x <- as.numeric(x)
      panel$y <- as.numeric(y)
    }
    panel
  }
  gulls.panel <- rp.control()
  image.file <- file.path(system.file(package = "rpanel"), "images", "gulllmks.gif")
  rp.image(gulls.panel, image.file, imagename="gulls.image", action = click.capture)

## End(Not run)
```

`rp.listbox` *Listbox for a panel*

Description

This function adds a listbox to the panel. When an item is pressed, a variable is set and an action function is called.

Usage

```
rp.listbox(panel, variable, vals, labels = vals,
           rows=length(labels), initval=vals[1], pos=NULL,
           title=deparse(substitute(variable)), action=I, foreground=NULL,
           background=NULL, font=NULL, parentname=deparse(substitute(panel)),
           sleep = 0.01, name=paste("listbox", .nc(), sep=""), ...)
```

Arguments

`panel`	the panel in which the listbox should appear.
`variable`	the name of the variable whose value is set by the listbox.
`vals`	the values of `var` used by the listbox. NOTE: Not currently in use, intended to be.
`labels`	the labels for values of var offered by the listbox.
`rows`	the number of rows in the list. This defaults to the number of labels. If the number of labels is greater than the number of rows the listbox will be displayed with a scrollbar.
`initval`	the initial value of <var> (optional). The initial value can also be specified in the call to `rp.control`.
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`title`	the label for the listbox.
`action`	the function which is called when an item is chosen.
`foreground`	colour of the text
`background`	colour of the text background
`font`	font to be used
`parentname`	this specifies the widget inside which the listbox should appear.
`sleep`	a length of time in seconds, passed to `Sys.sleep`, which can be used to overcome a technical problem in some computer systems. If the listbox appears blank, then setting this parameter to a slightly value may fix the problem.
`name`	name assigned to the listbox, used for disposing of the widget
`...`	...

Details

The function `action` should take one argument, which should be the panel to which the listbox is attached.

See `rp.grid` for details of the grid layout system.

Value

If the argument `panel` is the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

Note

The former arguments `parent` and `...` have been discontinued in version 1.1. Note also that the argument `var` has been renamed `variable` to avoid reserved word issues.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.checkbox`,`rp.control`

Examples

```
## Not run:
   data.plotfn <- function(panel) {
     if (panel$plot.type == "histogram")
       hist(panel$x)
     else
       if (panel$plot.type == "boxplot")
         boxplot(panel$x)
       else
         plot(density(panel$x))
     panel
   }
   panel <- rp.control(x = rnorm(50))
   rp.listbox(panel, plot.type,
       c("histogram", "boxplot", "density estimate"),
       action = data.plotfn, title = "Plot type")

## End(Not run)
```

`rp.lm` *Graphical display of linear models with no more than two explanatory variables*

Description

This function is primarily intended to provide graphical representations of linear models with no more than two explanatory variables. These can be covariates or factors or a mixture of the two. When there are more than two explanatory variables the model is passed on to the `rp.coefficients` or `rp.drop1` functions.

Usage

```
rp.lm(x, ylab, xlab, zlab, panel = TRUE, panel.plot = TRUE,
      style = 'ggplot', plot.nodes = FALSE,
      uncertainty.display = 'density', inference = 'coefficients',
      ci = TRUE, cols, display.model, comparison.model,
      residuals.showing, linewidth = 1,
      hscale = 1, vscale = hscale, ...)
```

Arguments

`x`	a formula defining the linear model or a fitted linear model object.
`ylab, xlab, zlab`	character variables used for the axis labels.
`panel`	a logical value which determines whether a panel is created to allow interactive control of the fitted models.
`panel.plot`	a logical value which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
`style`	a character variable determining whether `ggplot` graphics are used. Any value other than `'ggplot'` invokes an older form of the function with standard graphics. `ggplot` style is strongly recommended.
`plot.nodes`	a logical value, relevant only when the function is called in non-interactive mode (`panel = FALSE`), which determines whether the lattice of model nodes is plotted or the plot of the data and fitted model is returned. In the latter case, the returned object is a `ggplot` object.
`uncertainty.display`	a character value which determines whether the uncertainty display is in `'density'` or `'shading'` style.
`inference`	a character value which determines whether the inference display is based on `'coefficients'` or `'terms'`.
`ci`	a logical value which is passed to the `rp.coefficients` function when this is used to display model coefficients. When `ci` is set to `FALSE` uncertainty is placed around 0 in hypothesis test style.
`cols`	a named character vector of colours to be used in constructing the display. See `help(rp.colours)` for details.

`display.model` a one sided formula which determines the specific model to be displayed. This can be a reduced model which omits some of the terms present in the model defined by `x`, or an expanded model which includes interaction terms.

`comparison.model` a one sided formula which determines the specific model to be compared with the displayed model. This can be a reduced model which omits some of the terms present in the model defined by `x` or, when at least one factor is present, an expanded model which includes an interaction term.

`residuals.showing` a logical value which determines whether residuals are displayed when there are two covariates.

`linewidth` a numerical value which sets the `linewidth` parameter in the case of one covariate and one factor.

`hscale`, `vscale` scaling parameters for the size of the plot when `panel.plot` is set to `TRUE`. The default values are 1.

`...` other arguments passed on to `lm` when `x` is a formula rather than a fitted model.

Details

The display of the data is adapted to the form of the explanatory variables. When `panel = TRUE` a lattice of potential models is displayed in graphical form. When a node of the lattice is clicked the corresponding fitted model is displayed. When a connection between adjacent models is clicked, a comparison of the two adjacent models is displayed, either as model coefficients (`display = 'coefficients'`) or model terms (`display = 'coefficients'`).

When the model defined by `x` contains two explanatory variables, where at least one is a factor, the models which can be fitted include the interaction term, even where this is not explicitly included in `x`.

When there are exactly two covariates in `x`, the function will not consider an interaction between these, even when `x` includes this.

If `display.model` is not specified, its default setting is NULL when `panel = TRUE` and the model specified by `x` when `panel = FALSE`.

Missing data are removed before the linear models are fitted.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  y <- rnorm(50, mean = 10, sd = 0.5)
  rp.normal(y)
```

```
## End(Not run)
```

`rp.logistic` *Interactive display of logistic regression with a single covariate*

Description

The function `rp.logistic` plots a binary or binomial response variable against a single covariates and creates a panel which controls the position of a logistic curve and allows a logistic regression to be fitted to the data and displayed on the plot.

Usage

```
rp.logistic(x, y, xlab = NA, ylab = NA, panel.plot = TRUE, panel = TRUE,
            hscale = NA, vscale = hscale, alpha = 0, beta = 0,
            display = c("jitter" = FALSE, "regression line" = FALSE,
            "fitted model" = FALSE))
```

Arguments

`x`	a vector of covariate values.
`y`	a vector of response values with two levels, or a two-column matrix whose first column is the number of 'successes' and the second column is the number of 'failures' at each covariate value.
`xlab`	a character variable used for the covariate axis label.
`ylab`	a character variable used for the response axis label.
`panel.plot`	a logical variable which determines whether the plot is placed inside the control panel.
`panel`	a logical variable which determines whether an interactive panel is created.
`hscale, vscale`	horizontal and vertical scaling factors for the size of the plots. It can be useful to adjust these for projection on a screen, for example. The default values are 1.
`alpha`	the initial value of the intercept parameter.
`beta`	the initial value of the slope parameter.
`display`	the initial settings of the checkboxes which control whether the data are 'jittered' for visual effect and whether the movable and fitted regression lines are displayed.

Details

The control panel allows a logistic regression line to be drawn on the plot and the intercept and slope of the linear predictor altered interactively. The fitted logistic regression can also be displayed.

If `y` is a vector of responses with two values, these are treated as a factor which is then converted to the (0,1) scale by `as.numeric`.

The values of the response variable can be 'jittered'.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.regression

Examples

```
## Not run:
  rp.logistic(river$Temperature, river$Low)

## End(Not run)
```

---

rp.menu *Top level menu for a panel*

Description

This function adds a menu to the top of the panel window. When a menu item is selected, a variable is set and an action function is called.

Usage

```
rp.menu(panel, variable, labels, initval = NULL, action = I,
        foreground = NULL, background = NULL, font = NULL,
        name = paste("menu", .nc(), sep = ""))
```

Arguments

panel	the panel to which the menu should be attached should appear.
variable	the name of the variable whose value is set by the menu.
labels	the labels for the menu options. These values are returned through variable. The menu is defined by a list of lists of character strings. In each sub-list, the first item is the menu heading with the following items providing the options available.
initval	the initial value of variable (optional). The initial value can also be specified in the call to rp.control.
action	the function which is called when a menu item is chosen.
foreground	this sets the colour of text e.g. 'navy'
background	this sets the background colour of text e.g. 'white'
font	this sets the text font e.g. 'Arial'
name	the name of the widget - this is used by rp.widget.dispose

Details

The function `action` should take one argument, which should be the panel to which the listbox is attached.

The list for a menu consisting of "File" and "Edit" only would be defined as `list(list("File"), list("Edit"))`.

The list for a menu consisting of "File" with subitem "Quit", and "Edit" with subitems "Copy", "Cut" and "Paste", would be defined as `list(list("File", "Quit"), list("Edit", "Copy", "Cut", "Paste"))`.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

The action function must be defined before `rp.menu` is called.

Note

The former argument `parent` was discontinued in version 1.1 and the name of the variables whose value is set by the menu was renamed as `variable` from `var` in version 2.0 as the latter is a reserved word.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.checkbox`,`rp.control`

Examples

```
## Not run:
   a <- rp.control()
   # The action function has to come first so that it already exists for rp.menu,
   # as it creates the callback functions on the fly it requires action to already
   # be defined.
   domenu <- function(panel) {
      rp.messagebox(panel$menuchoice, title = "You chose")
      panel
      }
   rp.menu(a, menuchoice, labels=list(list("File","Quit"),
              list("Edit","Copy","Cut","Paste")), action=domenu)

## End(Not run)
```

`rp.messagebox` *Displays a message*

Description

This function displays a message in a pop-up window.

Usage

```
rp.messagebox(..., title="rpanel Message")
```

Arguments

`...`	parameters containing the message to be displayed.
`title`	the title for the message window.

Details

The pop-up window remains displayed and no other action can be taken, until the 'ok' button is pressed.

Value

None.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.control`

Examples

```
## Not run:
   rp.messagebox("Click OK to continue.", title = "Test message")

## End(Not run)
```

`rp.mururoa` *Sampling in Mururoa Atoll*

Description

This function is based on a real sampling study on the effects of nuclear experiments conducted between 1966 and 1996 in the South Pacific, at the atolls of Mururoa and Fangataufa, (Report by International Advisory Committee, IAEA, 1998). As part of the assessment of subsequent radiological conditions, both terrestrial and aquatic samples were collected and assayed for activities due to strontium-90, caesium-137, plutonium and tritium. The sampling scenario in the function is based on water sampling by boat in the Mururoa atoll. A graphical control panel allows users to select sampling points. Once the user has drawn a sample, some simple predictions over the whole atoll can be produced.

Usage

```
rp.mururoa(hscale = NA, col.palette = rev(heat.colors(40)), col.se = "blue", file = NA,
    parameters = NA)
```

Arguments

`hscale`	a scaling parameter which expands (>1) or contracts (<1) the size of the plot within the panel. This can be useful for projection onto a screen, for example. The vertical scale is set to the same value as the horizontal scale, to ensure that the plot is square. The default values are 1.
`col.palette`	the colour palette used to display the predicted and true spatial surfaces.
`col.se`	the colour used to draw the standard error contours on the predicted surface.
`file`	the name of a file to which the sampled data will be written.
`parameters`	a list which can be used to change the parameters which control the simulated measurement data.

Details

The panel controls allow the user to experiment with random and systematic sampling, with further control of the alignment and patterns of points in the systematic case. The number of points can also be selected. When a sample is taken, simulated data are generated. Some further controls allow predicted surfaces and standard errors to be displayed, using different types of trend functions. The geoR package is used to construct these predictions. The true simulated surface can also be displayed, to indicate the success of the predictions.

Once the data have been sampled, a data file may be saved for further analysis external to the `rp.mururoa` function, using the `file` argument. A convenient way of saving to the current working directory, for example to a file named `mururoa.dmp`, is to set the `file` argument to `file.path(getwd(), "mururoa.dmp")`. The `load` function can then be applied to the saved file to create an object called `mururoa.data`, which is a three-column matrix with the x and y locations in columns 1 and 2 and the observed values in column 3.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Bowman, A.W., Gibson, I., Scott, E.M. and Crawford, E. (2008). Interactive Teaching Tools for Spatial Sampling. Journal of Statistical Software, 36, 13, 1–17.

See Also

rp.firth, rp.geosim

Examples

```
## Not run:
  rp.mururoa()

## End(Not run)
```

---

rp.normal *Interactive fitting of a normal distribution*

Description

This function plots a histogram of a sample of data and creates a panel which controls the mean and standard deviation of the normal distribution which is fitted to the data and displayed on the plot.

Usage

```
rp.normal(y, ylab = deparse(substitute(y)),
          panel.plot = TRUE, hscale = NA, vscale = hscale)
```

Arguments

y	a vector of data.
ylab	a character variable used for the histogram axis label.
panel.plot	a logical parameter which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
hscale, vscale	scaling parameters for the size of the plot when panel.plot is set to TRUE. The default values are 1.

Details

The interactive controls allow a normal density curve to be added to the histogram, with double-buttons used to control the values of the normal mean and standard deviation. The fitted normal density based on the sample mean and standard deviation can also be displayed.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  y <- rnorm(50, mean = 10, sd = 0.5)
  rp.normal(y)

## End(Not run)
```

---

rp.notebook *Define a notebook within an rpanel*

Description

A tabbed notebook, the location of which is defined by pos, is created within an rpanel. Further widgets, grids or even notebooks can then be placed within the notebook.

Usage

```
rp.notebook(panel, tabs, tabnames=tabs, width = 600, height = 400, pos = NULL,
  foreground = NULL, background = "lightgray", font = NULL,
  parentname = deparse(substitute(panel)),
  name = paste("notebook", .nc(), sep = ""), ...)
rp.notebook.raise(panel, parentname, label)
```

Arguments

panel	the panel in which the notebook should appear.
tabs	this is a vector of the names to appear on the tabs
tabnames	this is a vector of the labels to be used internally - used by rp.notebook.raise
width	the width, in pixels, of the notebook
height	the height, in pixels, of the notebook
pos	the position of the notebook. see rp.pos

foreground	this sets the colour of text e.g. "navy"
background	this sets the background colour of text e.g. "white"
font	this sets the text font e.g. "Arial"
parentname	this specifies the widget inside which the notebook should appear.
name	the name of the widget - this is used by rp.widget.dispose
label	the name of the tab which is to be raised
...	...

Details

The role of this function is to specify a notebook. Nesting of notebooks is permitted. rp.notebook.raise is used to bring the contents of a particular tab to the foreground.

These functions make use of the BWidget extension to the Tcl/Tk system. If Bwidget has not been installed on your system, download it from https://sourceforge.net/projects/tcllib/files/BWidget/ and expand the compressed file into a folder. On a Windows machine, this folder should then be copied into the folder containing the Tcl libraries that were installed as part of R. This may be in a location such as C:\Program Files\R\R-4.0.2\Tcl\lib (with an obvious change to the version number of R being used). On a Mac, the downloaded folder should be copied into the folder where the main Tcl package is located (note: not inside the Tcl folder but at the same level as the Tcl folder). This may be in a location such as /usr/local/lib.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
panel <- rp.control(title="Notebook example with two notebooks")
rp.notebook(panel, c("File", "Edit"), width=600, height=400,
            pos=list(row=0, column=0), background="lightgray",
            font="Arial", name="n1")
rp.notebook.raise(panel, "n1", "Edit")
rp.button(panel, function(panel){
                 rp.messagebox("Button pressed!"); panel },
                 "Test this", parentname="Edit")
rp.messagebox("A second tabbed notebook can be added to the same window.")
rp.notebook(panel, c("A tab 1", "A tab 2"), width=200, height=200,
            pos=list(row=1, column=1), background="Navy", foreground="White")
rp.messagebox("A tabbed notebook can be placed inside a tabbed notebook.")
rp.notebook(panel, c("Tab within tab", "Another tab"),
            width=200, height=100, parentname="File", name="n3")
rp.notebook.raise(panel, "n1", "File")
rp.notebook.raise(panel, "n3", "Another tab")

## End(Not run)
```

`rp.panel` *Returns a panel*

Description

Returns a named (by passing the name as a string parameter) panel.

Usage

```
rp.panel(panelname)
```

Arguments

`panelname`	optional string parameter. If set the panel of that name is returned, if not set the most recently created panel is returned.

Value

If `panelname` is set, the panel of that name is returned. If it is not set, the most recently created panel is returned.

Warning

Note: returning of the most recent panel may fail when running R on a Windows machine in DOS. A warning is contained within the function.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.control`

Examples

```
## Not run:
   # create a panel - will be created in .rpenv as "newpanel"
   rp.control(panelname = "newpanel")
   # creates the panel, but does not return a handle to it - created as ".rpanel2"
   rp.control()
   # pick up the first panel
   panel2 <- rp.panel("newpanel")

## End(Not run)
```

`rp.plot3d` *Interactive display of a plot of three variables*

Description

This function produces a scatterplot of three variables, using the **rgl** package for three-dimensional display.

Usage

```
rp.plot3d(x, y, z, xlab  = NA, ylab = NA, zlab = NA,
              axes = TRUE, new.window = TRUE, type = "p", size = 3, col = "red",
                  cex = 1, xlim = NA, ylim = NA, zlim = NA, plot = TRUE, ...)
```

Arguments

x, y, z	vectors of observed values.
xlab	a character variable used for the first axis label.
ylab	a character variable used for the second axis label.
zlab	a character variable used for the third axis label.
axes	a logical variable determining whether the axes are shown.
new.window	a logical variable which determines whether a new window is opened (TRUE) or the current plot is clear and the new plot is drawn in the existing window (FALSE).
type	a character variable controlling the type of plotting. If the value is set to "n", the points are not plotted.
size	the size of the plotted points.
col	the colour of the plotted points.
cex	a numeric value allowing expansion or contractions of the size of the text in the annotation of the axes.
xlim	the plotting range for the first variable.
ylim	the plotting range for the second variable.
zlim	the plotting range for the third variable.
plot	a logical variable which determines whether a plot is drawn. It can be useful to set this to FALSE when only the scaling function is required.
...	other rgl parameters which control the appearance of the plotted points.

Details

The plot is produced by appropriate calls to the **rgl** package. This allows interactive control of the viewing position. Other objects may subsequently be added to the plot by using **rgl** functions and data which are centred and scaled by the returned values indicated below.

Value

A scaling function is returned to allow further objects to be added to the plot. The function accepts `x, y, z` vector arguments and returns a list with `x, y, z` components defining the co-ordinates for plotting. An illustration is given in the example below.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.regression

Examples

```
## Not run:
  x <- rnorm(50)
  y <- rnorm(50)
  z <- rnorm(50)
  scaling <- rp.plot3d(x, y, z, xlim = c(-3, 3))
  # In addition you may add a line to the plot with these two lines;
  #  a <- scaling(c(-3,3), c(0,0), c(0,0))
  #  rgl::lines3d(a$x, a$y, a$z, col = "green", size = 2)

## End(Not run)
```

---

rp.plot4d *Animated scatterplot*

Description

This function plots two covariates coloured by a response variable and animates this by a third covariate. In particular, it is useful for plotting spatiotemporal data.

Usage

```
rp.plot4d(x, z, y, model, group, subset,
          col.palette, col.breaks, col.labels,
          hscale = 1, vscale = hscale, panel = TRUE,
          x1lab, x2lab, zlab, ylab, cex = 1,
          display = "image", Display = NULL,
          background.plot = NULL, foreground.plot = NULL,
          z.window = "normal", z.window.pars = c(min(z), sd(z)/5),
          coords = rep(NA, 2), radius = 0.05,
          col.circle = "black", lwd.circle = 1,
          location.plot = TRUE, retain.location.plot = FALSE,
          group.level, group.name, colour.key = TRUE,
```

```
            z.key = TRUE, new.window = TRUE,
            eqscplot = FALSE, location.plot.type = "histogram")

   rp.spacetime(space, time, y, model, group, subset, col.palette,
                col.breaks, col.labels, hscale = 1, vscale = hscale,
                panel = TRUE, x1lab, x2lab, zlab, ylab, cex = 1,
                display = "image", Display = NULL,
                background.plot = NULL, foreground.plot = NULL,
                time.window = "normal",
                time.window.pars = c(min(time), sd(time)/5),
                coords = rep(NA, 2), radius = 0.05,
                col.circle = "black", lwd.circle = 1,
                location.plot = TRUE, retain.location.plot = FALSE,
                group.level, group.name, colour.key = TRUE,
                z.key = TRUE, new.window = TRUE,
                eqscplot = TRUE, location.plot.type = "histogram")
```

Arguments

x, space	a two column matrix of covariates, in particular defining spatial locations.
z, time	a vector of values, such as times, over which the scatterplot will be animated.
y	a vector of response values which will be used to colour the plotted points.
model	a list with components x (a two-column matrix), z (a vector) and y (an array) which defines the fitted values (y) over a regular grid of x and z values. When group is not present y should be three-dimensional. When group is present it should be four-dimensional, with the fourth dimension indexing the fitted values of the model at the different levels of group. model may also contain a reference component which will be used to add the deviations, in units of standard error, from a reference model.
group	an optional factor allowing plots to be created for each factor level.
subset	a vector of logical values or indices which will be used to subset x (or space), z (or time), y, group before plotting.
col.palette, col.breaks, col.labels	the colour palette used to colour the points, the break points on the scale which define the range associated with the each colour and the labels associated with the break points. If col.palette is missing, topo.colors(20) will be used, or topo.colors with the number of colours set by the number of levels when y is a factor. If col.breaks is missing then a regular grid over the range of the observed data is used. If col.labels is specified then the colour key has a grid of equally spaced colour blocks labelled by col.labels; otherwise the scale is linear. Setting col.breaks and col.labels differently can be useful if the data y are on a transformed scale but labels on the original scale are desired.
hscale, vscale	scaling parameters for the size of the plot when panel is set to TRUE. The default values are 1.
panel	a logical value determining whether an interactive plot with control panel is created.

`x1lab`, `x2lab`, `zlab`, `ylab`
: the axis labels of the variables

`cex`
: a numerical value with default 1 which allows the size of axis labels to be altered.

`display`
: a character string which determines whether an `"image"`, `"persp"` or `"rgl"` plot is displayed.

`Display`
: a logical vector which controls whether the points, and where present model and reference information, are displayed.

`background.plot`, `foreground.plot`
: function to add further graphical material, such as a map, onto the background or foreground of the plot.

`z.window`, `time.window`
: a character string which determines whether the window in `z` is initially "normal" or "uniform". This can be changed in the interactive panel.

`z.window.pars`, `time.window.pars`
: a vector of length two which sets initial values for the location and width of the `z.window`. These values can be changed in the interactive panel.

`coords`
: a vector of length two which defines the location of the window in the `x` space when the function is not used interactively (`panel = FALSE`).

`radius`
: the radius of the window in the `x` space when the function is not used interactively.

`col.circle`, `lwd.circle`
: the colour and line width of the circle used to define the window in the `x` space.

`location.plot`
: a logical value which determines whether the mouse can be used to interact with the `x` plot to create a plot of `y` against `z` for a nominated neighbourhood.

`retain.location.plot`
: a logical value which determines the initial state of the checkbox determining whether a plot of `y` against `z` for a nominated neighbourhood remains in place after the mouse has been released.

`group.level`
: the initial value of the `group` factor. This defaults to the first level.

`group.name`
: an optional character value giving a name to the `group` variable.

`colour.key`
: a logical value which determines whether the colour key is plotted. It can be useful to omit this when multiple static plots are produced with a common colour key.

`z.key`
: a logical value which determines whether a key to indicate the current value of `z` is plotted. It can be useful to omit this when multiple static plots are produced with the same value of `z`.

`new.window`
: a logical variable which determines whether a new window is opened (TRUE) or the current plot is clear and the new plot is drawn in the existing window (FALSE).

`eqscplot`
: a logical value which determines whether the `x` plot is constructed by using the `eqscplot` function in the **MASS** package, so that the same distances on each axis represent the same changes in the corresponding axis variables.

`location.plot.type`
: a character variable controlling whether a histogram or a density estimate (using the **lattice** package) is produced when `y` is a factor or absent and a location plot is requested by clicking the mouse on the plot of `x`.

Details

The colour black should be avoided when using a normal window shape for z. This is because hsv shading is used to indicate increasing distance from the current z location and black has an hsv representation with s component 0, which cannot therefore be reduced further.

Value

The tcltk panel object is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
# The quakes data

with(quakes, {
  rp.plot4d(cbind(long, lat), depth)
  rp.plot4d(cbind(long, lat), depth, mag)
})

# SO2 over Europe

with(SO2, {
  location <- cbind(longitude, latitude)

  if (require(mgcv) & require(maps)) {
     location1 <- location[,1]
     location2 <- location[,2]
     model <- gam(logSO2 ~ s(location1, location2, year))
     loc1  <- seq(min(location1), max(location1), length = 30)
     loc2  <- seq(min(location2), max(location2), length = 30)
     yr    <- seq(min(year), max(year), length = 30)
     newdata <- expand.grid(loc1, loc2, yr)
     names(newdata) <- c("location1", "location2", "year")
     model <- predict(model, newdata)
     model <- list(x = cbind(loc1, loc2), z = yr,
                   y = array(model, dim = rep(30, 3)))
     mapxy <- map('world', plot = FALSE,
                  xlim = range(longitude), ylim = range(latitude))
     rp.plot4d(location, year, logSO2, model,
                 col.palette = rev(heat.colors(20)),
                 foreground.plot = function() map(mapxy, add = TRUE))
  }
  else
    rp.plot4d(location, year, logSO2, col.palette = rev(heat.colors(20)))
})

# Dissolved Oxygen in the River Clyde
```

```
with(Clyde, {

  rp.plot4d(cbind(Doy, DO), Station, location.plot = FALSE)
  rp.plot4d(cbind(Station, DO), Doy, location.plot = FALSE)
  rp.plot4d(cbind(Station, Doy), Year, DO)

  # Highlight the data before and after a sewage treatment plant update in 1985
  ind     <- Year >= 80 & Year <= 89 & !(Year == 85)
  year    <- Year[ind] + Doy[ind] / 365
  station <- Station[ind]
  doy     <- Doy[ind]
  do      <- DO[ind]
  group   <- factor(c("after 1985", "before 1985")[1 +
                 as.numeric(year < 85)])
  rp.plot4d(cbind(doy, do), station, group,
       col.palette = c("red", "green"), location.plot = FALSE)
})


## End(Not run)
```

`rp.pos` *Positioning controls in an rpanel*

Description

This function provides demonstrations of the use of the `pos` argument in functions to create controls.

Usage

```
rp.pos(layout="default")
```

Arguments

`layout`	the type of panel layout to be demonstrated. Valid options are "default", "pack", "place" and "grid".

Details

The various functions to create controls accept a parameter called `pos` which can be used to specify the layout of the controls. It has various modes of operation and the mode is determined from the type of information provided in the `pos` argument. The different modes are outlined below.

default If `pos` is not specified, controls are arranged in a column with the most recent added to the bottom. Each control is aligned to the left hand side.

pack if `pos` is set to `"left"`, `"right"`, `"top"` or `"bottom"`, then the control is set to the left, right, top or bottom edge of the panel. If there is already a control in that position, the new control is placed beside that control, closer to the centre. (This uses Tk's "pack" layout manager.)

place If `pos` is set to a vector of four integer values, these are interpreted as `(x, y, width, height)` where all dimensions are in pixels. `x` and `y` define the co-ordinates in from the left hand side and down from the top respectively. When using this mode of laying out objects, it usually helps to define the size of the panel in `rp.control`. (This uses Tk's "place" layout manager.)

grid This mode provides greater flexibility in layout. The following arguments can be passed to `pos` in any of the function calls to create controls. Alternatively, `pos` can be passed a list which has these named components.

column An integer which specifies the column number. Columns count from 0. This is a mandatory field for grids.

row An integer which specifies the row number. Rows count from 0. This is a mandatory field for grids.

grid A string which gives the name of the grid the control has to be placed in. This field is optional. If omitted the default grid belonging to the panel is used.

columnspan An integer which specifies how many columns the control should span. Columns are counted to the right from the start column specified by `column`. This field is optional. If omitted one column is assumed.

rowspan An integer which specifies how many rows the control should span. Rows are counted down from the start row specified by *row*. This field is optional. If omitted one row is assumed.

width An integer which specifies the width of the control. For controls with writing (buttons, listboxes etc) this is in characters and for images this is in pixels. This field is optional. If omitted the control is sized horizontally to fill the cell the control is placed within.

height An integer which specifies the height of the control. For controls with writing (buttons, listboxes etc) this is in characters and for images this is in pixels. This field is optional. If omitted the control is sized vertically to fill the cell the control is placed within.

sticky An string which specifies how the control expands to fill the cell. This is a string with any combination of 'n', 'e', 'w', 's', representing north/east/west/south expansions. An empty string assignment ('') will centre the control. If the argument is not assigned a value then the control is 'w' (west) aligned by default.

background Specifies the background colour of the grid. If left blank this defaults to the operating system's standard background colour.

(This uses Tk's "grid" layout manager.)

The "grid" mode of layout should not be mixed with the other modes.

`rp.power` *Interactive power calculations for a two-sample t-test*

Description

This function creates a panel which allows the sample size, population means and common standard deviation to be set. The corresponding power curve for a two-sample t-test is displayed in the graphics window.

Usage

```
rp.power(panel = TRUE, panel.plot = TRUE,
         populations.showing = FALSE,
         ngrid = seq(10, 300), mu1 = 0, mu2 = 1,
         sigma = 1, n = 20, xgrid = seq(- 4, 5, length = 100),
         popdens.lim = 0.7, hscale = 1, vscale = hscale)
```

Arguments

panel	a logical value determining whether an interactive panel is created or a static plot is produced.
panel.plot	a logical value, relevant to the tcltk case only, determining whether the plot is placed inside the panel.
populations.showing	a logical value determining whether the populations are initially showing.
ngrid	a vector which determines the grid a sample sizes used.
mu1, mu2	the initial values of the means of the two populations.
sigma	the initial value of the common standard deviation of the two populations.
n	the initial value of the sample size.
xgrid	the grid of values over which the populations are plotted.
popdens.lim	the upper limit on the population density scale.
hscale, vscale	scaling parameters for the size of the plot.

Details

The sample size refer to the total sample size, assuming two groups of equal size. A checkbox allows plots of the population distributions also to be displayed.

Value

The tcltk panel object is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  rp.power()

## End(Not run)
```

`rp.radiogroup` *Radiobuttons for a panel*

Description

This function adds a set of radiobuttons to the panel. When a radiobutton is pressed, a variable is set and an action function is called.

Usage

```
rp.radiogroup(panel, variable, vals, labels=NULL, initval=vals[1], pos=NULL,
  title=deparse(substitute(variable)),
  action=I, foreground=NULL, background=NULL, font=NULL,
 parentname=deparse(substitute(panel)), name=paste("radiogroup", .nc(), sep=""), ...)
```

Arguments

`panel`	the panel in which the radiobuttons should appear.
`variable`	the name of the variable whose values are set by the buttons.
`vals`	the values attached to the labels for return from the action function. NOTE: for implementation.
`labels`	the labels for the radiobuttons.
`initval`	the initial value for the variable (optional). The initial value can also be specified in the call to `rp.control`.
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`title`	the label for the group of radiobuttons.
`action`	the function which is called when a button is pressed.
`foreground`	colour of the text
`background`	colour of the text background
`font`	font to be used
`parentname`	this specifies the widget inside which the radiogroup should appear.
`name`	name assigned to the listbox, used for disposing of the widget
`...`	...

Details

The function `action` should take one argument, which should be the panel to which the radiobuttons are attached.

See `rp.grid` for details of the grid layout system.

Value

If the argument `panel` is the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.checkbox`, `rp.control`

Examples

```
## Not run:
   data.plotfn <- function(panel) {
     if (panel$plot.type == "histogram")
       hist(panel$x)
     else
       if (panel$plot.type == "boxplot")
         boxplot(panel$x)
       else
         plot(density(panel$x))
     panel
     }
   panel <- rp.control(x = rnorm(50))
   rp.radiogroup(panel, plot.type,
       c("histogram", "boxplot", "density estimate"),
       action = data.plotfn, title = "Plot type")

## End(Not run)
```

`rp.regression` *Graphical display of regression effects (interactive with one or two covariates)*

Description

When there are one or two covariates, specified through the `x` and `y` arguments, the function `rp.regression` creates a panel which controls the model which is fitted to the data and displayed on the plot. In the case of two covariates, a three-dimensional display is created. If a formula or a fitted linear model is passed through the `x` argument, then a graphical display of the regression effects is created, irrespective of the number of covariates. The function `rp.regression2` is retained simply for compatibility with earlier releases of the package.

Usage

```
rp.regression(x, y, ylab = NA, x1lab = NA, x2lab = NA, xlab = NA,
              model = "None", line.showing = TRUE,
              residuals.showing = FALSE, size = 3,
              panel = TRUE, panel.plot = TRUE, hscale = NA,
              vscale = hscale, yrange, ci = TRUE,
              point.estimate = !ci, labels, subset, ngrid = 200, col)
rp.regression2(y, x1, x2, ylab  = NA, x1lab = NA, x2lab = NA,
               panel = TRUE, model = "None", residuals.showing = FALSE,
               size = 3, col = "red", ...)
```

Arguments

x	a vector or two column matrix of covariate values, or a formula, or a fitted linear model.
y	a vector of response values. This is not required if x is a formula or a fitted linear model.

The following arguments refer to the case of one or two covariates, specified explicitly:

x1, x2	vectors of covariate values.
ylab	a character variable used for the response axis label.
x1lab	a character variable used for the first covariate axis label.
x2lab	a character variable used for the second covariate axis label.
xlab	a character variable used for the first covariate axis label. This is provided for convenience as a more natural argument name when there is only one covariate.
model	a character variable defining the model to be fitted initially (two covariates only). The valid values are "None", the name of the first and second covariates and the combination of these names combined with " and ".
line.showing	a logical value determining whether a regression line is shown on the initial plot (one covariate only).
residuals.showing	a logical value determining whether the residuals are shown on the initial plot.
size	the size of the plotted points (two covariates only).

The following arguments refer to the case where the **tcltk** package is used:

panel	a logical variable which determines whether a panel is created to allow interactive control of the fitted models (two covariates only).
panel.plot	a logical variable which determines whether the plot is placed inside the control panel (one covariate only).
hscale, vscale	scaling parameters for the size of the plot when panel.plot is set to TRUE. The default values are 1.

The following argument refers to the case where a regression model is specified through a formula or a call to the lm function:

yrange	a vector of length 2 giving the range of values for the change in the response when regression effects are plotted in a static display.
ci	a logical variable which controls whether the graphical indication of uncertainty is placed around the estimate of each model coefficient (ci = TRUE) or around 0 (ci = FALSE).
point.estimate	a logical variable which controls whether the point estimates of the regression effects are superimposed as vertical lines.
labels	a character vector which gives the labels to be used for each model coefficient (in subset, if this is specified). The covariate range information will be added by the function. Labels must be provided for all terms, before the subset information is applied (see next argument). The labels vector can also be larger than the number of coefficients in model to allow a consistent set of positions when models of different size are viewed successively. (This is used by the rp.ancova function.)
subset	an integer vector which specifies which model coefficients are included in the display. The vector refers to the coefficients as listed in the output of the summary function on the fitted model. If this is not specified then all model coefficients are included apart from the intercept, identified by the standard name '(Intercept)'.
ngrid	an integer which specifies the number of grid points used in the creation of the uncertainty strips.
col	the colour of the plotted points (two covariate case) or the point estimates of the regression effect (general case).
...	additional arguments used when the function is called by rp.lm.

Details

In the case of one covariate, the control panel allows a line to be drawn on the plot and its intercept and slope altered interactively. The residuals and the least squares fitted line can be displayed. When the fitted line is displayed, the effects of moving individual points can be viewed by clicking and dragging.

In the case of two covariates, the plot is constructed with the aid of the rgl package for three-dimensional display, through the rpanel function rp.plot3d. This display can be rotated and linear models involving one, two or none of the covariates can be displayed. Residuals can also be superimposed. Static plots, for printing or other purposes can be created by setting the panel argument to FALSE and specifying model and residuals.showing as required.

If x is a formula or a fitted linear model, then a static plot of the regression effects is created. Each coefficient is scaled by the length of the range of corresponding covariate values, in order to display the regression effects in a manner which allows these to be compared. Density strips are used to indicate the uncertainty involved. The uncertainty strips have a common maximum intensity, as this makes it easier to assess the 'extremity' of values of interest for distributions which are very diffuse.

Value

When x is a formula or a fitted linear model, the plot is returned as a ggplot object. This allows details of the plot to be modified through further ggplot functions. In other cases, the panel object is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.plot3d

Examples

```
## Not run:
  with(CofE, {
    rp.regression(Employ, Giving)
    rp.regression(cbind(Employ, Attend), Giving)
    rp.regression(Giving ~ Employ + Elect + Attend)
   rp.regression(cbind(Employ, Attend), Giving, model = "Employ and Attend", panel = FALSE)
  })

## End(Not run)
```

---

rp.rmplot *Interactive plotting of repeated measurement data*

Description

This function creates a panel which controls the display of data which have a repeated measurement structure across time. Groups, means and standard errors can be displayed. Individual profiles can also be inspected.

Usage

```
rp.rmplot(y, id = NA, timept = NA, fac = NA, type = "all",
                          xlab = NA, ylab = NA, xlabels = NA, add = FALSE,
                          lwd = 1, col = NA, lty = NA, panel = TRUE,
                          panel.plot = TRUE, hscale = NA, vscale = hscale, ...)
```

Arguments

y	a vector, matrix or dataframe of response data. If y is a matrix or dataframe, the rows should correspond to cases and the columns to the repeated measurements.
id	when y is a vector, id should contain the identifiers for the individual profiles.
timept	when y is a vector, timept should contain the time value associated with each repeated measurement. When y is a matrix or dataframe timept may identify the values associated with the repeated measurements (columns); in this case the default value is the sequence from 1 to the number of repeated measurements.
fac	an optional factor to split the data into groups.

type	when the function is not running in interactive panel mode, this character variable determines the type of plot produced. It can be set to "all", "mean", "mean+bar" or "band". The last option is applicable only when there are two groups of data.
xlab	the x-axis label.
ylab	the y-axis label.
xlabels	labels for the repeated measurements, to be printed on the x-axis.
add	a logical variable which determines whether the repeated measurements graph is added to an existing plot. This is only appropriate when panel = FALSE.
lwd	the width of the lines drawn for each repeated measurements profile.
col	a vector of colours associated with each of the factor levels in fac.
lty	a vector of linetypes associated with each of the factor levels in fac.
panel	a logical variable controlling whether an interactive panel is created.
panel.plot	a logical parameter which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
hscale, vscale	scaling parameters for the size of the plot when panel.plot is set to TRUE. The default values are 1.
...	further arguments which will be passed to the plot call in the construction of the graph.

Details

This function is designed principally for repeated measurements over time, with common time points for each profile. A set of radiobuttons allows all the individual profiles to be plotted, or summaries in the form of means and two standard errors. A checkbox allows the data to be split into groups identified by the variable fac. When there are only two groups, a band can be displayed to indicate time points at which the distance between the observed means is more than two standard errors of the differences between the means.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   LH    <- luthor[,2:16]
   gp    <- factor(luthor[,1])
   times <- c(1:5,(5+(1:10)/2))
   rp.rmplot(log(LH), fac = gp, timept = times)

## End(Not run)
```

`rp.sample` *Interactive exploration of sampling variation*

Description

Graphical exploration of variation in samples and sample means. The primary use of the function is in interactive mode, using a variety of controls for the display. Normal or binomial distributions can be used.

Usage

```
rp.sample(n, mu, sigma, distribution  = 'normal', shape = 0,
          panel = TRUE, nbins = 20, nbins.mean = 20,
          display, display.sample, display.mean, nsim = 50,
          show.out.of.range = TRUE, ggplot = TRUE,
          hscale = NA, vscale = hscale, pause = 0.01)
```

Arguments

`n`	the size of the sample. If this is missing, it is set to 25.
`mu`	the mean of the distribution from which samples are taken. If this is missing it is set to 5 for a normal distribution and 0.5 for a binomial distribution.
`sigma`	the standard deviation of the normal distribution. If this is missing it is set to 0.4.
`distribution`	a character value which determines whether a `'normal'` or `'binomial'` distribution is used.
`shape`	the shape parameter of the skew-normal distribution. When this is set to the default value of 0, samples are generated from a normal distribution. Setting non-zero values for this parameter gives some skewness to the distribution from which the data are sampled.
`panel`	a logical value which determines whether the function runs in interactive mode. See Details.
`nbins`	an integer value which sets the number of bins used in the data histograms.
`nbins.mean`	an integer value which sets the number of bins used in the histogram of the sample means.
`display`	a logical value which determines the form of graphical display used initially or in non-interactive mode. Possible values are `'histogram'` (the default), `'density'` or `'violin'`.
`display.sample`	a logical vector which controls options for graphical display of the data, used initially or in non-interactive mode. See Details.
`display.mean`	a logical vector which controls options for graphical display of the sample means, used initially or in non-interactive mode. See Details.
`nsim`	an integer value which the number of accumulated mean values which are plotted when the function runs in non-interactive mode. See Details.

show.out.of.range
: a logical value which controls whether observations lying beyond 3 standard deviations (for samples) or 3 standard errors (for sample means) are indicated. The scales of the plots are fixed at 3 standard deviations above and below the mean so that the axes are fixed for all samples.

ggplot
: a logical value which controls whether ggplot graphics are used. If this is set to FALSE or the **ggplot2** package is not available, functionality reverts to the standard graphics version available in **rpanel** 1.1-5 which has simpler functionality. The ggplot version of the function is recommended.

hscale, vscale
: scaling parameters for the size of the plot when panel.plot is set to TRUE. The default values are 1.

pause
: a time delay, in seconds, for the insertion of components into the control panel. The speed of some computing systems can create a panel which does not expand in time to contain all its components. The pause argument adds a short delay to each component to avoid this.

Details

When display is set to density or violin, density estimates are constructed using a bandwidth which is optimal for a normal distribution. For small samples this provides a stable and conservative estimate which is not unduly influenced by features which may well simply be due sampling variation. As the sample size increases, the estimate will still converge to the true density function.

When the size of the sample is less than 10, a histogram or density estimate is not a very effective display. This also causes issues of scaling the vertical axis. So in this case individual points are displayed instead.

The visual effect of the animation is assisted by holding the axes constant. This means that there may occasionally be observations outside the displayed horizontal range, or a histogram height which exceeds the displayed vertical range. This is denoted by a + symbol at the top of the relevant histogram bars. This issue can often be tackled by reducing the number of histogram bins.

When display is set to 'density' or 'violin', individual points are plotted, with a random vertical position. This is suppressed when the number of points exceeds 5000.

The display.sample and display.mean arguments control the details of what is displayed initially and, more usefully, when the function operates in non-interactive mode. Each argument is a logical vector with named values. display.sample has the default setting c(data = TRUE, population = FALSE, mean = FALSE, 'st.dev. scale' = FALSE) while the default for display.mean is c('sample mean' = FALSE, 'accumulate' = FALSE, 'se scale' = FALSE, 't-statistic' = FALSE, 'zoom' = FALSE, 'distribution' = FALSE). Any elements of these arguments which are not explicitly identified are set to the default values. In the case of binomial data the 'st.dev. scale' setting is disabled as it is not a helpful addition to the plot.

The principal use of the function is in interactive mode, when panel is set to TRUE. If panel is set to FALSE then interactive mode is switched off. In this case, if the ggplot2 package is available and the ggplot argument is set to TRUE, the function returns plots of a sample of data and of accumulated means as components plotdata and plotmean of the returned object. The number of accumulated means is set by the nsim argument.

If the ggplot2 package is not available, standard graphics are used with simpler display options, along the lines of the function provided in version 1.1-5 of the package.

Value

When the function operates in interactive mode, with `panel` set to `TRUE`, nothing is returned. When `panel` is set to `FALSE`, plots of a sample of data and of accumulated means are provided as components `sample` and `mean` of the returned object.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.sample()

## End(Not run)
```

`rp.screenresolution` *Screen resolution*

Description

This returns the current screen resolution as a list with two components; width and height.

Usage

```
rp.screenresolution()
```

Arguments

None

Details

One use of this function is to identify the size of the screen so that panels can be constructed top match this using pixel co-ordinates. However, the grid layout system is likely to be a better option in general. See `rp.grid` for details of this.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.grid`,`rp.pos`

`rp.slider` *Slider for an rpanel*

Description

Add a slider (or slider group) to the panel, to graphically control a numeric variable.

Usage

```
rp.slider(panel, variable, from, to, action=I, labels=NULL, names=NULL, title=NULL,
  log=rep(FALSE, length(from)), showvalue=FALSE, showvaluewidth=4, resolution=0,
   initval=from, pos=NULL,
   horizontal=TRUE, foreground=NULL, background=NULL, font=NULL,
  parentname=deparse(substitute(panel)), name=paste("slider", .nc(), sep=""), ...)
rp.slider.change(panel, name, value, i=1, do=TRUE)
```

Arguments

`panel`	the panel in which the slider appears.
`variable`	the name of the variable that the slider controls.
`from`	the lower limit of the range of values to which the slider can be set.
`to`	the upper limit of the range of values to which the slider can be set.
`action`	the function which is called when the slider is moved.
`labels`	displayed labels
`names`	the names of the elements of `variable`, for reference by action functions.
`title`	the label of the slider.
`log`	a logical variable which controls whether the scale of the slider is logarithmic.
`showvalue`	a logical variable which determines whether the present value of "var" is shown. This is forced to FALSE when log is TRUE.
`showvaluewidth`	the number of significant digits in the shown value
`resolution`	the resolution of the slider scale. If > 0, all values are rounded to an even multiple of this value. The default is 0.
`initval`	the initial value of var (optional). The initial value can also be specified in the call to `rp.control`.
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`horizontal`	a logical variable determining whether the slider is displayed horizontally (or vertically).
`foreground`	colour of the text
`background`	colour of the text background
`font`	font to be used
`parentname`	this specifies the widget inside which the slider should appear.

name	name assigned to the slider, used for disposing of the widget
...	...
value	new value for the slider
i	which slider to alter
do	whether to call the action event

Details

The function action should take one argument, which should be the panel to which the slider is attached.

See rp.grid for details of the grid layout system.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

Note that setting log=TRUE and showvalue=TRUE is not allowed. The slider value shown would be incorrect (it wouldn't be the log value) and so showvalue is over-ridden and set to FALSE. A new widget rp.label is under development which would be used in these circumstances.

Note

New for version 2.0 is support for multiple sliders in a group. See demo(rp.slider).

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.radiogroup,rp.control

Examples

```
## Not run:
density.draw <- function(panel) {
   plot(density(panel$x, bw = panel$h))
   panel
   }
panel <- rp.control(x = rnorm(50))
rp.slider(panel, h, 0.5, 5, log = TRUE, action = density.draw)

printer <- function(panel) {
  print(panel$h)
  panel
}
panel <- rp.control(x = rnorm(50), h=c(1,2,3))
```

```
rp.slider(panel, h, c(0.5,0.5,0.5), c(5,5,5),
  log = c(TRUE,TRUE,TRUE), action = printer,
  title=c('h','h1','h2'), initval=c(1,2,3))

# An example which changes the slider position through another widget

draw <- function(panel) {
  hist(panel$x)
  abline(v=panel$v, col="red", lty=2)
  panel
}

redraw <- function(panel) {
  rp.tkrreplot(panel, plot)
  panel
}

redraw1 <- function(panel) {
  rp.tkrreplot(panel, plot)
  rp.slider.change(panel, "slider", panel$v)
  panel
}

x <- rnorm(25)
panel <- rp.control(v = 0, x = x)
rp.tkrplot(panel, plot, draw, pos="right")
rp.slider(panel, v, min(x), max(x), redraw, name = "slider")
rp.doublebutton(panel, v, diff(range(x))/100, action=redraw1)


## End(Not run)
```

`rp.surface` *Interactive visualisation of a surface and its uncertainty*

Description

This function plots a surface and uses interactive interrogation by the mouse, or a sequence of animations, to indicate the uncertainty in the surface as an estimate of the true surface.

Usage

```
rp.surface(surface, covariance, x1grid, x2grid, x, y, Display = "persp",
                  hscale = 1, vscale = hscale, panel = TRUE,
                  Speed = 5, ntime = 10, ninterp = 50,
            zlim = NULL, col.palette = topo.colors(100), coords = rep(NA, 2))
```

Arguments

surface	a matrix of estimated surface values over a regular grid.
covariance	the covariance matrix for the estimates in surface, corresponding to the estimates in vector form c(surface).
x1grid, x2grid	vectors defining the regular grids over each margin of surface.
x	an optional two-column matrix of observed covariate values.
y	an optional vector of response values.
Display	a character value which determines the initial type of surface plot. Options are "image" (the default) and "persp".
hscale, vscale	scaling parameters for the size of the plot.
panel	a logical variable which determines whether a panel is created to allow interactive control.
Speed	this determines the initial value of the speed of animations by setting the value of the sleep time (in hundredths of a second, with an offset of 2) between displayed surfaces.
ntime	the number of interpolated surfaces displayed between successive simulated surfaces, to control the smoothness of the animation.
ninterp	the number of grid values in each dimension when constructing a surface for the "image" display option. This is used because the input grid of surface may have quite low resolution which produces a rather chunky image display. A finer grid is constructed if the interp package is available.
zlim	a vector of length two which defines the range of plotting on the surface scale. By default, zlim is determined by the range of surface plus and minus three standard deviations (available from covar).
col.palette	the colour palette used to paint the surface. The colours are determined simply by the height of the surface.
coords	a vector of length two which defines the location where the uncertainty in the surface is examined, through the construction of a variability interval. This applies when panel = FALSE and Display = "image".

Details

The interactive controls allow the surface to be plotted using image or persp displays, and with the display of uncertainty through mouse click and drag on the image plot or animation.

Value

Nothing is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
if (require(sm)) {
   with(trawl, {
      location  <- cbind(Longitude, Latitude)
      model     <- sm.regression(location, Score1, ngrid = 15, display = "none")
      longitude <- model$eval.points[ , 1]
      latitude  <- model$eval.points[ , 2]
      xgrid     <- as.matrix(expand.grid(longitude, latitude))
      S         <- sm.weight2(location, xgrid, model$h)
      covar     <- tcrossprod(S) * model$sigma^2
      rp.surface(model$estimate, covar, longitude, latitude, location, Score1)
   })
}
## End(Not run)
```

`rp.t_test` *Graphical display for inference in comparing the means of one or two samples*

Description

The sample(s) of data are plotted along with a graphical display which indicates the uncertainty in the location of the true means and in their difference. This is done by plotting a shaded representation of a normal distribution in 'violin plot' style. This can also be compared with a reference mean, representing the null hypothesis in a t-test.

Usage

```
rp.t_test(x, y = NULL, panel = TRUE, mu = NULL, data.display = 'density',
          display = c(distribution = FALSE, detail = FALSE),
          ruler.position = 'none', candidate, print = FALSE,
          cols, xlab, ylab, vlab, hscale = 1, vscale = hscale, ...)
```

Arguments

`x`	a vector of data on a continuous scale or a formula with a response variable and a single predictor variable which is a factor with two levels.
`y`	an optional second vector of data on a continuous scale, to allow two-sample or paired-sample analyses. Alternatively, `y` may be a character vector or a factor with two levels, defining the groups. If `x` is a formula then `y` is ignored.
`panel`	a logical value which determines whether the function runs in interactive mode.
`mu`	a numerical value representing a reference mean of interest, for example a null hypothesis in a formal test. This is the same parameter as `mu` in `t.test` but its default value is `NULL` so that a reference value will be display only if requested.
`data.display`	a character value which controls the form of the data and display. Valid options are `'histogram'`, `'density'` or `'violin'`.

display	a named logical vector which controls the form of uncertainty to be displayed. The named elements are 'distribution' for display of the reference distribution and 'detail' for the display of further details.
ruler.position	a character value which determines whether a standard error scale is added to the plot and its location, 'candidate' or 'sample mean'.
candidate	a numeric value controlling where the standard error ruler is located when ruler.position is set to 'candidate'.
print	a logical value which controls whether the results are printed on the console.
cols	the colours to be used in constructing the display. The default values are set by the rp.colours function whose help file give the details.
xlab, ylab, vlab	character values providing labels for the group(s) to be analysed and for the measurement scale (vlab).
hscale, vscale	scaling parameters for the size of the plot when panel is set to TRUE. The default values are 1.
...	further named argument, which will be passed on to the t.test function. Useful arguments include paired and var.equal which both take logical values.

Details

The graphics are created through the **ggplot2** package so this needs to be installed.

The function aims to follow the general pattern of the t.test function and the arguments of t.test described in its help file can also be passed to rp.t_test.

Value

A ggplot object is returned. This allows further alterations and annotations to be made.

References

Bowman, A.W. (2019). Graphics for uncertainty (with discussion). Journal of the Royal Statistics Society, Series A, Statistics & Society, 182, 403-418.

Examples

```
## Not run:
x <- rnorm(50)
rp.t_test(x)
rp.t_test(x, mu = 0)
rp.t_test(x, uncertainty = 'sample mean')
rp.t_test(x, uncertainty = 'reference')

g <- factor(rep(1:2, each = 25))
plt <- rp.t_test(x ~ g)
plt + ggplot2::ggtitle("Two-sample inference")

## End(Not run)
```

`rp.tables` *Interactive statistical tables*

Description

This function launches a panel which allows standard normal, t, chi-squared and F distributions to be plotted, with interactive control of parameters, tail probability and p-value calculations.

Usage

```
rp.tables(panel = TRUE, panel.plot = TRUE,
          hscale = NA, vscale = hscale,
          distribution = "normal", degf1 = 5, degf2 = 30,
          observed.value = " ",
          observed.value.showing = !is.na(observed.value),
          probability = 0.05, tail.probability, tail.direction, heading)
```

Arguments

`panel`	a logical value determining whether an interactive panel is created or a static plot is produced.
`panel.plot`	a logical parameter, relevant to the `tcltk` case only, which determines whether the plot is placed inside the panel (TRUE) or the standard graphics window (FALSE).
`hscale`, `vscale`	horizontal and vertical scaling factors, relevant to the `tcltk` case only, for the size of the plot when `panel.plot` is set to `TRUE`. It can be useful to adjust these for projection on a screen, for example. The default values are 1.
`distribution`	a character string which determines which distribution is to be plotted. Current options are "normal" (default), "t", "chi-squared" and "F".
`degf1`, `degf2`	The degrees of freedom used for the chi-squared (`degf1`) and F (`degf1`, `degf2`) distributions.
`observed.value`	a numerical value, or a character string which will be converted by `as.numeric`, which identifies an observed value whose location within the distribution is of interest.
`observed.value.showing`	a logical value which determines whether the observed value (if any) is displayed on the plot.
`probability`	the value of the tail probability used when tail area is shaded.
`tail.probability`	a character string which determines whether the tail area is drawn from the observed value (`"from observed value"`), using a fixed probability (`"fixed probability"`) or not shown (`"none"`).
`tail.direction`	a character string which determines whether the lower (`"lower"`), upper (`"upper"`) or two-sided (`"two-sided"`) tail area is drawn.
`heading`	a character string which will appear as a heading of the plot. If this is missing, a heading based on the selected distribution will be created.

Details

The panel contains radiobuttons to select the standard normal, t, chi-squared or F distributions. Doublebuttons are available to control the degrees of freedom. An observed value can be added to the plot, with optional determination of the corresponding p-value. Alternatively, shaded areas corresponding to tail probabilities of specified value can be displayed.

Value

The `tcltk` panel object is returned.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
  rp.tables()

## End(Not run)
```

---

rp.text *Text boxes for a panel*

Description

This function adds one or more boxes which allow text to be entered.

Usage

```
rp.text(panel, text, pos=NULL, action=I, foreground=NULL, background=NULL,
        font=NULL, width=NULL, parentname=deparse(substitute(panel)),
        name = paste("text", .nc(), sep=""), ...)
rp.text.change(panel, name, text)
```

Arguments

`panel`	the panel on which the text should appear.
`text`	the text to be displayed
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`action`	the function which is called when the text has been entered.
`foreground`	colour of the text
`background`	colour of the text background
`font`	font to be used

width	character width of the textboxes
parentname	this specifies the widget inside which the text entry widget should appear.
name	name assigned to the textentries; used for disposal etc
...	...

Details

The function action should take one argument, which should be the panel to which the text box is attached.

See rp.grid for details of the grid layout system.

Warning

The action function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the action function will be lost.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.control

Examples

```
## Not run:
panel <- rp.control(x=1)
callback <- function(panel)
{
  rp.text.change(panel, "t2", panel$x)
  panel$x = panel$x+1
  panel
}
rp.text(panel, "This is a test", name="t1")
rp.text(panel ,"And so is this", font="Arial", foreground="white",
        background="navy", action=callback, name="t2")
rp.text(panel,"Here is some more text, this time across several lines.\n
               Here is some more text, this time across several lines.\n
               Here is some more text, this time across several lines.", name="t3")

## End(Not run)
```

`rp.textentry` *Text entry boxes for a panel*

Description

This function adds one or more boxes which allow text to be entered.

Usage

```
rp.textentry(panel, variable, action = I, labels = NULL, names = labels,
  title = NULL, initval = rep(NA, length(labels)), pos = NULL,
  foreground = NULL, background = NULL, font = NULL, width = 20, keydown = FALSE,
 parentname = deparse(substitute(panel)), name = paste("textentry", .nc(), sep=""), ...)
```

Arguments

`panel`	the panel in which the text entry box(es) should appear. This may be passed as a panelname string or the panel object itself.
`variable`	the name of the variable which will be assigned the text entered into the box(es).
`action`	the function which is called when the text has been entered.
`labels`	a character string of labels for the text entry boxes.
`names`	a character string of the names of the elements of `variable` which can be referred to within action functions.
`title`	title above multiple textentries
`initval`	the initial value(s) for var (optional). The initial value(s) can also be specified in the call to `rp.control`.
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`foreground`	colour of the text
`background`	colour of the text background
`font`	font to be used
`width`	character width of the textboxes
`keydown`	if TRUE the action function will be called on every key press - this may not be wise
`parentname`	this specifies the widget inside which the text entry widget should appear. In the current version, it should not normally be used.
`name`	name assigned to the textentries; used for disposal etc
`...`	...

Details

The function `action` should take one argument, which should be the panel to which the text entry box is attached.

See `rp.grid` for details of the grid layout system.

Value

If the argument `panel` is set to the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

Note

The former arguments `names`, `title` and `parent` have been discontinued in version 1.1. Note also that the argument `var` has been renamed `variable` to avoid reserved word issues.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.control

Examples

```
## Not run:
   plotf <- function(panel) {
      with(panel, {
   pars   <- as.numeric(pars)
         xgrid <- seq(0.1, max(c(pars[3], 5), na.rm = TRUE), length = 50)
         dgrid <- df(xgrid, pars[1], pars[2])
         plot(xgrid, dgrid, type = "l", col = "blue", lwd = 3)
         if (!is.na(pars[3])) {
            lines(rep(pars[3], 2), c(0, 0.95 * max(dgrid)), lty = 2, col = "red")
            text(pars[3], max(dgrid), as.character(pars[3]), col = "red")
            }
         })
      panel
      }

   panel <- rp.control(pars = c(5, 10, NA))
   rp.textentry(panel, pars, plotf, labels = c("df1", "df2", "observed"),
          initval = c(10, 5, 3))
   rp.do(panel, plotf)

## End(Not run)
```

`rp.timer` *Creates a series of timed actions*

Description

This creates an interval timer and allows the user to set the criteria to stop the timer.

Usage

```
rp.timer(panel, microseconds, action, where)
```

Arguments

`panel`	the panel which has some relevant variables.
`microseconds`	time between each call of action.
`action`	function to be executed on each timer tick.
`where`	a function which should return true or false, taking parameter panel. When false the loop will stop.

Details

This allows the user to setup an interval timer and the function to be called at each 'tick'.

Care should be taken when writing code to anticipate interactions with the panel while activity controlled by a timer is underway, as these interactions may cause changes in the state of the panel.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.control`

Examples

```
## Not run:
  stopme <- function(panel) panel$count<=20
  callme <- function(panel) {
    print(panel$count)
    panel$count = panel$count+1
    panel
  }
  panel <- rp.control(count=1)
  rp.timer(panel, 500, callme, stopme)

## End(Not run)
```

`rp.tkrplot` *Facilities for placing R plots inside* **tcltk** *windows.*

Description

These functions allow R graphics to be displayed in a panel.

Usage

```
rp.tkrplot(panel, name, plotfun, action=NA,  mousedrag=NA, mouseup=NA, hscale=1,
       vscale=1, pos=NULL, foreground=NULL, background=NULL, margins=c(0, 0, 0, 0),
           parentname=deparse(substitute(panel)), mar= par()$mar, ...)
rp.tkrreplot(panel, name)
```

Arguments

`panel`	the panel in which the plot should appear. This may be passed as a panelname string or the panel object itself.
`name`	the name of the plot. This is subsequently used in tkrreplot to specify the plot to be redrawn. If `name` is not supplied as a string it will be converted to one by calling `deparse(substitute(name))`.
`plotfun`	the function used to create the plot.
`action`	the function called when the plot is clicked.
`mousedrag`	the function called when the mouse is dragged.
`mouseup`	the function called when the mouse is released.
`hscale`	horizontal scaling factor to control the width of the plot.
`vscale`	vertical scaling factor to control the height of the plot.
`pos`	the layout instructions. Please see the `rp.pos` example and help for full details.
`background`	the colour used for the background of the plot.
`foreground`	the filename of a transparent gif file. This will be overlaid on the tkrplot image after plotting takes place.
`margins`	an integer vector of length 4 giving the margin sizes, in pixels and in the usual order, for the placing of the foreground image.
`parentname`	this specifies the widget inside which the plot should appear. In the current version of rpanel, it should not normally be used.
`mar`	mar parameter for specifying the margins.
`...`	...

Details

The function `action` should take one argument, which should be the panel to which the tkrplot is attached.

See `rp.grid` for details of the grid layout system.

Value

If the argument `panel` is set to the panelname string, the same string is returned. If the panel object is used, the altered panel is assigned to both the calling level and panel's environment level.

Warning

The `action` function should return the panel. Without this assignment any widgets added or alterations made to panel parameters within the `action` function will be lost.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.image`

Examples

```
## Not run:
   draw <- function(panel) {
      plot(1:20, (1:20)^panel$h)
      panel
      }

   redraw <- function(panel) {
      rp.tkrreplot(panel, tkrp)
      panel
      }

   rpplot <- rp.control(title = "Demonstration of rp.tkrplot", h = 1)
   rp.tkrplot(rpplot, tkrp, draw)
   rp.slider(rpplot, h, action = redraw, from = 0.05, to = 2.00, resolution = 0.05)

## End(Not run)
```

---

rp.var.get *Retrieves an object from the rpanel environment, usually from a panel.*

Description

The management of objects within the rpanel environment is usually handled 'behind the scenes' but it can occasionally be useful to retrieve an object there explicitly.

Usage

```
rp.var.get(panelname, name)
```

Arguments

panelname	the panelname of the relevant panel. This is usually identified as panel$panelname. If this argument is set to NULL then the object is not retrieved from a panel.
name	the name of the variable in character form.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.var.get

---

rp.var.put *Places an object in the rpanel environment, usually within a panel.*

Description

The management of objects within the rpanel environment is usually handled 'behind the scenes' but it can occasionally be useful to place an object there explicitly.

Usage

```
rp.var.put(panelname, name, val, labels = NULL)
```

Arguments

panelname	the panelname of the relevant panel. This is usually identified as panel$panelname. If this argument is set to NULL then the object is not placed inside a panel.
name	the name of the variable.
val	the contents of the variable as a numeric or character vector.
labels	labels for var.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

rp.var.get

`rp.widget.dispose` *Removes a widget*

Description

This will dispose/remove a widget from a panel.

Usage

```
rp.widget.dispose(panel, name)
```

Arguments

`panel`	the panel on which the text should disappear.
`name`	the name assigned to the widget on creation.

Details

This will dispose of a widget and its memory usage.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

See Also

`rp.control`

Examples

```
## Not run:
 p1 <- rp.control()
 rp.button(p1, I, "press me", name="b1")
 rp.widget.dispose(p1, "b1")

## End(Not run)
```

rp.wrangle *Collate and organise specific datasets*

Description

Specific datasets are read and reorganised into a convenient form for analysis.

Usage

```
rp.wrangle(name)
```

Arguments

name	a single character string giving the name of the dataset required.

Details

Calling the function with no arguments, as `rp.wrangle()`, will print the names of the datasets available.

The **readxl**, **readr** and **dplyr** packages are used for some datasets.

Value

The dataset required, returned as a dataframe or tibble. If the function is called with no arguments, the dataset names are returned in a dataframe along with appropriate comments.

Examples

```
## Not run:
  rp.wrangle()
  rp.wrangle("cofe_2019")

## End(Not run)
```

Scottish_referendum *The Scottish referendum on independence*

Description

These data record the results of the Scottish referendum on independence held in 2014. The variables include the votes counted in each local council area along with other social characteristics.

References

Scottish Independence Referendum 2014: Analysis of results. Research Paper 14/50, 30 September 2014. https://commonslibrary.parliament.uk/research-briefings/rp14-50/

SO2 *Sulphur dioxide measurements over Europe*

Description

The data document values of SO2, on a log scale, from monitoring stations across Europe from 1990 to 2001. The data were collected through the 'European monitoring and evaluation programme' (EMEP) and they are available at https://www.emep.int. The data recorded here have been organised into a convenient form for analysis.

The data file consists of six variables: `site`: a site code for the monitoring station `longitude`: longitude of the monitoring station `latitude`: latitude of the monitoring station `year`: year of measurement `month`: month of measurement `logSO2`: SO2 measurement on a log scale

References

Spatiotemporal smoothing and sulphur dioxide trends over Europe A. W. Bowman, M. Giannitrapani and E. M. Scott. Applied Statistics, 58 (2009), 737–752

Examples

```
## Not run:
  Month     <- SO2$month + (SO2$year - 1990) * 12
  Year      <- SO2$year + (SO2$month - 0.5) / 12
  Location  <- cbind(SO2$longitude, SO2$latitude)
  back      <- I
  if (require(maps)) {
   mapxy <- map('world', plot = FALSE,
              xlim = range(SO2$longitude), ylim = range(SO2$latitude))
      back  <- function() map(mapxy, add = TRUE)
  }
  rp.plot4d(Location, Year, SO2$logSO2, col.palette = rev(heat.colors(12)),
              background.plot = back)

## End(Not run)
```

vasoconstriction *Toxins for the eradication of flour beetles*

Description

These data are from an experiment, reported by Gilliatt (1948), on vasoconstriction of fingers after a single deep breath. The measurement process was not sufficiently precise to determine the degree of vasoconstriction, simply its presence or absence. Interest lay in how the presence of vasoconstriction relates to the volume and flow rate of air during the intake of breath.

Details

Finney (1947) reported the data and discussed a variety of models in some depth. Note that the table of data in this paper seems to contain a misprint, with observation 32 showing a rate of 0.03 while the plots indicate this to be 0.30. This dataframe incorporates this correction.

References

Finney, D. (1947). The estimation from individual records of the relationship between dose and quantal response. Biometrika 34, 320-334. Gilliatt, R. W. (1948). Vaso-constriction in the finger after deep inspiration. Journal of Physiology 107, 76-88.

Examples

```
## Not run:
with(vasoconstriction, {
  plot(log(Rate), log(Volume), type = 'n')
  text(log(Rate), log(Volume), as.character(Vasoconstriction))
})

## End(Not run)
```

---

worldbank — *Data on CO2 emissions, GDP, life.expectancy and population for the countries of the world between 1960 and 2007*

Description

Loading this file makes the dataframes `co2.emissions`, `gdp`, `life.expectancy` and `population` available. These contain the CO2 emissions, gross domestic product, life expectancy and population data for each country of the world (rows indexed by rownames) for the years 1960-2007.

These data are provided by the World Bank through the database at `http://data.worldbank.org/data-catalog/world-de`
The data are also used use in the Google Public Data Explorer `http://www.google.com/publicdata/directory`
and by the Gapminder project `http://www.gapminder.org`)

The data are used in the rp.bubbleplot example script.

References

rpanel: Simple interactive controls for R functions using the tcltk package. Journal of Statistical Software, 17, issue 9.

Examples

```
## Not run:
   rp.bubbleplot(log(gdp), log(co2.emissions), 1960:2007, size = population,
      col = life.expectancy,
      interpolate = TRUE, hscale = 1.5, vscale = 1.5)

## End(Not run)
```

Index

∗ **dynamic**
aircond, 5
Astrand, 6
cholesterol, 6
Clyde, 7
CofE, 8
doctors_smoking, 8
flour_beetles, 9
gullweight, 9
Hyde, 10
Loch_Leven, 11
luthor, 11
mammal_speed, 12
poisons, 13
river, 13
rodent, 14
rp.ancova, 15
rp.anova, 16
rp.block, 18
rp.bubbleplot, 19
rp.button, 20
rp.cartoons, 21
rp.checkbox, 22
rp.ci, 24
rp.clearlines, 25
rp.colour.key, 27
rp.colours, 28
rp.combo, 29
rp.contingency, 31
rp.control, 32
rp.control.put, 33
rp.deleteline, 36
rp.do, 37
rp.doublebutton, 38
rp.drop1, 40
rp.firth, 41
rp.geosim, 42
rp.grid, 44
rp.gulls, 45
rp.image, 46
rp.likelihood, 48
rp.line, 49
rp.listbox, 51
rp.lm, 53
rp.logistic, 55
rp.menu, 56
rp.messagebox, 58
rp.mururoa, 59
rp.normal, 60
rp.notebook, 61
rp.panel, 63
rp.plot3d, 64
rp.plot4d, 65
rp.power, 70
rp.radiogroup, 72
rp.regression, 73
rp.rmplot, 76
rp.sample, 78
rp.screenresolution, 80
rp.slider, 81
rp.t_test, 85
rp.tables, 87
rp.text, 88
rp.textentry, 90
rp.timer, 92
rp.tkrplot, 93
rp.var.get, 94
rp.var.put, 95
rp.widget.dispose, 96
rpanel-package, 3
Scottish_referendum, 97
SO2, 98
vasoconstriction, 98
worldbank, 99
∗ **iplot**
aircond, 5
Astrand, 6
cholesterol, 6

Clyde, 7
CofE, 8
doctors_smoking, 8
flour_beetles, 9
gullweight, 9
Hyde, 10
Loch_Leven, 11
luthor, 11
mammal_speed, 12
poisons, 13
river, 13
rodent, 14
rp.ancova, 15
rp.anova, 16
rp.block, 18
rp.bubbleplot, 19
rp.button, 20
rp.cartoons, 21
rp.checkbox, 22
rp.ci, 24
rp.clearlines, 25
rp.colour.key, 27
rp.colours, 28
rp.combo, 29
rp.contingency, 31
rp.control, 32
rp.control.put, 33
rp.deleteline, 36
rp.do, 37
rp.doublebutton, 38
rp.drop1, 40
rp.firth, 41
rp.geosim, 42
rp.grid, 44
rp.gulls, 45
rp.image, 46
rp.likelihood, 48
rp.line, 49
rp.listbox, 51
rp.lm, 53
rp.logistic, 55
rp.menu, 56
rp.messagebox, 58
rp.mururoa, 59
rp.normal, 60
rp.notebook, 61
rp.panel, 63
rp.plot3d, 64
rp.plot4d, 65
rp.power, 70
rp.radiogroup, 72
rp.regression, 73
rp.rmplot, 76
rp.sample, 78
rp.screenresolution, 80
rp.slider, 81
rp.t_test, 85
rp.tables, 87
rp.text, 88
rp.textentry, 90
rp.timer, 92
rp.tkrplot, 93
rp.var.get, 94
rp.var.put, 95
rp.widget.dispose, 96
rpanel-package, 3
Scottish_referendum, 97
SO2, 98
vasoconstriction, 98
worldbank, 99

∗ **package**
rpanel-package, 3

aircond, 5
Astrand, 6

cholesterol, 6
Clyde, 7
co2.emissions *(*worldbank*)*, 99
CofE, 8

doctors_smoking, 8

flour_beetles, 9

gdp *(*worldbank*)*, 99
gullweight, 9

Hyde, 10

life.expectancy *(*worldbank*)*, 99
Loch_Leven, 11
luthor, 11

mammal_speed, 12

poisons, 13
population *(*worldbank*)*, 99

river, 13
rodent, 14
rp.ancova, *9*, 15
rp.anova, *13*, 16
rp.block, *5*, 18
rp.bubbleplot, 19
rp.button, *4, 5*, 20, *33*
rp.cartoons, 21
rp.checkbox, *4, 5*, 22, *31*, *33*, *52*, *57*, *73*
rp.ci, *4*, 24
rp.clearlines, *4*, 25
rp.coefficients, *4*, 26, *53*
rp.colors *(*rp.colours*)*, 28
rp.colour.key, *5*, 27
rp.colours, 28
rp.combo, *4*, 29, *33*
rp.contingency, *4*, 31
rp.control, *4, 5*, *18*, *21*, *23*, *31*, 32, *34*, *39*, *52*, *56–58*, *63*, *73*, *82*, *89*, *91, 92*, *96*
rp.control.put, 33
rp.datalink, 34
rp.deleteline, *4*, 36
rp.do, *5*, 37
rp.doublebutton, *4, 5*, *21*, *33*, 38
rp.drop1, *4*, 40, *53*
rp.firth, *4*, 41, *44*, *60*
rp.geosim, *4*, 42, *42*, *60*
rp.grid, *5*, *21*, *23*, *30*, *33*, *39*, 44, *47*, *52*, *72*, *80*, *82*, *89, 90*, *93*
rp.gulls, *4*, 45
rp.image, *4*, *26*, *33*, 46, *50*, *94*
rp.likelihood, *4, 5*, 48
rp.line, *4*, *26*, 49
rp.listbox, *4*, *30*, *33*, 51
rp.lm, *4*, 53
rp.logistic, *4*, *13*, 55
rp.menu, *4*, *33*, 56
rp.messagebox, *4*, 58
rp.mururoa, *4*, *42*, *44*, 59
rp.normal, *4*, 60
rp.notebook, 61
rp.panel, *5*, 63
rp.plot3d, *4*, 64, *75, 76*
rp.plot4d, *4*, *7*, 65
rp.pos, *5*, *20*, *23*, *30*, *38*, *44*, *47*, *51*, *61*, 69, *72*, *80, 81*, *88*, *90*, *93*
rp.power, *4*, 70
rp.radiogroup, *4, 5*, *23*, *33*, *37*, *39*, 72, *82*
rp.regression, *8*, *56*, *65*, 73
rp.regression2 *(*rp.regression*)*, 73
rp.rmplot, *4*, *11*, 76
rp.sample, *4*, 78
rp.screenresolution, 80
rp.slider, *4, 5*, *33*, 81
rp.spacetime, *4*
rp.spacetime *(*rp.plot4d*)*, 65
rp.surface, *4*, 83
rp.t_test, *4*, 85
rp.tables, *4*, 87
rp.text, *4*, *33*, 88
rp.textentry, *4, 5*, *33*, 90
rp.timer, *4*, 92
rp.tkrplot, *4*, *33*, *50*, 93
rp.tkrreplot, *4*
rp.tkrreplot *(*rp.tkrplot*)*, 93
rp.var.get, *5*, 94, *95*
rp.var.put, *5*, 95
rp.widget.dispose, *33*, *44*, *56*, *62*, 96
rp.wrangle, 97
rpanel *(*rpanel-package*)*, 3
rpanel-package, 3

Scottish_referendum, 97
SO2, 98

vasoconstriction, 98

worldbank, 99