Package ‘ERSA’

October 12, 2022

Type Package
Title Exploratory Regression 'Shiny' App
Version 0.1.3
Date 2020-9-22
Author Catherine B. Hurley
Maintainer Catherine B. Hurley <catherine.hurley@mu.ie>
Description Constructs a 'shiny' app function with interactive displays for summary and analysis of variance regression tables, and parallel coordinate plots of data and residuals.
License GPL (>= 2.0)
Encoding UTF-8
LazyData true
Imports shiny, miniUI, RColorBrewer, ggplot2, car, leaps, broom, dplyr, tidyr, purrr, combinat, stats, methods
RoxygenNote 7.1.1
Suggests knitr, rmarkdown, testthat
VignetteBuilder knitr
NeedsCompilation no
Repository CRAN
Date/Publication 2020-09-22 23:00:02 UTC

R topics documented:

  add1_models ................................................................. 2
  createERServer .............................................................. 2
  createERUI ................................................................. 3
  drop1_models ................................................................. 3
  ERSA ......................................................................... 4
  exploreReg ................................................................. 4
  pcpPlot ................................................................. 5
  plotSeqSS ................................................................. 6
add1_models

**Description**

Constructs a list of fits by adding predictors sequentially

**Usage**

```
add1_models(model, preds, data = NULL)
```

**Arguments**

- `model`: A linear model
- `preds`: Predictors to be added sequentially
- `data`: The dataset (optional)

**Value**

A list of linear fits

---

createERServer

**Description**

A function which returns a shiny server for Exploratory Regression

**Usage**

```
createERServer(
    ERfit,
    ERdata = NULL,
    ERbarcols = RColorBrewer::brewer.pal(4, "Set2"),
    ERnpcpCols = 4,
    pvalOrder = F
)
```
createERUI

Arguments

ERfit  the lm fit to be explored
ERdata  the data used to fit the model. If NULL, attempts to extract from ERfit.
ERbarcols  a vector of colours, one per term in lm. Will be expanded via colorRampPalette
           if not the correct length.
ERnpcpCols  number of colours for the PCP
pvalOrder  if TRUE, re-arranges predictors in order of p-value

Value

a function

createERUI  Constructs UI for Exploratory Regression app

Description

Constructs UI for Exploratory Regression app

Usage

createERUI(tablesOnly = F, gadget = TRUE)

Arguments

tablesOnly  if TRUE, shows Plots 1-3 only.
gadget  If TRUE, constructs a gadget, otherwise a shinyApp

Value

the UI

drop1_models  Constructs a list of fits by dropping predictors from the supplied model

Description

Constructs a list of fits by dropping predictors from the supplied model

Usage

drop1_models(model, preds, data = NULL)
Arguments

model    A linear model
preds    Predictors to be dropped
data     The dataset (optional)

Value

A list of linear fits

ERSA

ERSA: A package exploring regressions with a Shiny app

Description

The Exploratory Regression Shiny App (ERSA) package consists of a collection of functions for
displaying the results of a regression calculation, which are then packaged together as a shiny app
function.

exploreReg

A function to launch the Exploratory Regression Shiny App

Description

A function to launch the Exploratory Regression Shiny App

Usage

exploreReg(
  ERmfull,  
  ERdata = NULL, 
  ERbarcols = RColorBrewer::brewer.pal(4, "Set2"), 
  npcpCols = 4, 
  pvalOrder = F, 
  tablesOnly = F, 
  displayHeight = NULL, 
  gadget = TRUE, 
  viewer = "dialogViewer"
)
Arguments

- **ERmfull**: the lm fit to be explored
- **ERdata**: the data used to fit the model. If NULL, attempts to extract from ERmfull.
- **ERbarcols**: a vector of colours, one per term in lm. Will be expanded via colorRampPalette if not the correct length.
- **npcpCols**: number of colours for the PCP
- **pvalOrder**: if TRUE, re-arranges predictors in order of p-value
- **tablesOnly**: if TRUE, shows Plots 1-3 only.
- **displayHeight**: supply a value for the display height
- **gadget**: If TRUE, constructs a gadget, otherwise a shinyApp.
- **viewer**: For gadget, defaults to "dialogViewer". May be "paneViewer" or "browserViewer"

Value

the result

Examples

```r
f <- lm(mpg ~ hp+wt+disp, data=mtcars)
## Not run: exploreReg(f)
```

pcpPlot is a function that produces a PCP (Parallel Coordinate Plot) plot of the data, residuals or hat values from regression fits.

**Description**

A PCP plot of the data, residuals or hat values from regression fits

**Usage**

```r
pcpPlot(
  data,
  fit,
  type = "Variables",
 npcpCols = 4,
  resDiff = F,
  absResid = F,
  sequential = F,
  selnum = NULL
)
```
Arguments

data a data frame
fit a lm for the data frame
type one of "Variables", "Residuals", "Hatvalues"
npcpCols number of colours
resDiff difference residuals, TRUE or FALSE
absResid absolute residuals, TRUE or FALSE
sequential use sequential fits (TRUE) or drop1 fits (FALSE)
selnum row numbers of cases to be highlighted

Value

ggplot

Examples

f <- lm(mpg ~ wt+hp+disp, data=mtcars)
pcpPlot(mtcars, f, type="Residuals")

plotSeqSS(Plots barcharts of sequential sums of squares of lm

Description

Plots barcharts of sequential sums of squares of lm

Usage

plotSeqSS(fits, barcols = NULL, legend = F)

Arguments

fits list of lm objects
barcols a vector of colours, one per term in lms
legend TRUE or FALSE

Value

a ggplot

Examples

plotSeqSS(list(fit1= lm(mpg ~ wt+hp+disp, data=mtcars),
fit2=lm(mpg ~ wt+hp+disp, data=mtcars)))
plotSum

Plots of model summaries

Description

Plots of model summaries

Usage

plotAnovaStats(
  fit0,
  barcols = NULL,
  preds = NULL,
  alpha = 0.05,
  type = "SS",
  width = 0.3
)

plottStats(fit0, barcols = NULL, preds = NULL, alpha = 0.05, width = 0.3)

plotCIStats(
  fit0,
  barcols = NULL,
  preds = NULL,
  alpha = 0.05,
  stdunits = FALSE,
  width = 0.3
)

Arguments

- fit0: is an lm object
- barcols: a vector of colours, one per term in lm
- preds: terms to include in plot
- alpha: significance level
- type: "SS" or "F", from type 3 Anova
- width: bar width
- stdunits: TRUE or FALSE. If TRUE, coefficients refer to standardised predictor units.

Value

- a ggplot
reorderTerms

Functions

- plotAnovaStats: Plots barchart of F or SS from lm
- plottStats: Plots barchart of t stats from lm
- plotCIStats: Plots confidence intervals from lm

Examples

```r
plotAnovaStats(lm(mpg ~ wt+hp+disp, data=mtcars))
plottStats(lm(mpg ~ wt+hp+disp, data=mtcars))
plotCIStats(lm(mpg ~ wt+hp+disp, data=mtcars))
```

reorderTerms

Re-order model terms

Description

Re-order model terms

Usage

```r
pvalOrder(m, d = NULL, refit = TRUE)
b.selOrder(m, d = NULL, refit = TRUE, maxNPred = NULL)
f.selOrder(m, d = NULL, refit = TRUE, maxNPred = NULL)
revPredOrder(m, d = NULL, refit = TRUE)
randomPredOrder(m, d = NULL, refit = TRUE)
regsubsetsOrder(m, d = NULL, refit = TRUE, collapse = TRUE)
```

Arguments

- `m`: an lm object
- `d`: the data frame. If NULL, attempts to extract from m.
- `refit`: TRUE or FALSE
- `maxNPred`: maximum number of predictors to use, defaults to all.
- `collapse`: TRUE or FALSE

Value

- a vector of terms in order last to first, or an lm if refit=TRUE. regsubsetsOrder returns a list of predictor vectors, or a list of fits
Functions

- `pvalOrder`: Arranges model terms in order of increasing p-value
- `b.selOrder`: Arranges model terms using backwards selection
- `f.selOrder`: Forwards selection
- `revPredOrder`: Reverses order of terms in a fit
- `randomPredOrder`: Reorders terms in a fit randomly
- `regsubsetsOrder`: Best subsets regression.

Examples

```r
b.selOrder(lm(mpg~wt+hp+disp, data=mtcars))
f.selOrder(lm(mpg~wt+hp+disp, data=mtcars))
revPredOrder(lm(mpg~wt+hp+disp, data=mtcars))
randomPredOrder(lm(mpg~wt+hp+disp, data=mtcars))
regsubsetsOrder(lm(mpg~wt+hp+disp, data=mtcars))
```

termColours

Constructs colour vector for model terms

Description

Constructs colour vector for model terms

Usage

```r
termColours(f, pal = RColorBrewer::brewer.pal(4, "Set2"))
```

Arguments

- `f`: a model fit with term labels
- `pal`: use this palette

Value

A vector of colours. Residuals are given a grey color

Examples

```r
termColours(lm(mpg ~ wt+hp, data=mtcars))
```
Index

add1_models, 2
bselOrder (reorderTerms), 8
createERServer, 2
createERUI, 3
drop1_models, 3
ERSA, 4
exploreReg, 4
fse1Order (reorderTerms), 8
pcpPlot, 5
plotAnovaStats (plotSum), 7
plotCISstats (plotSum), 7
plotSeqSS, 6
plotSum, 7
plottStats (plotSum), 7
pvalOrder (reorderTerms), 8
randomPredOrder (reorderTerms), 8
regsubsetsOrder (reorderTerms), 8
reorderTerms, 8
revPredOrder (reorderTerms), 8
termColours, 9