Package 'forsearch'

April 24, 2022

Version 2.3.0

Title Outlier Diagnostics for Some Linear Effects and Linear Mixed Effects Models

Description Identifies potential data outliers and their impact on estimates and analyses. Uses the forward search approach of Atkinson and Riani, ``Robust Diagnostic Regression Analysis", 2000,<ISBN: o-387-95017-6>) to prepare descriptive statistics of a dataset that is to be analyzed by stats::lm(), stats::glm(), or nlme::lme(). Includes graphics functions to display the descriptive statistics.

License GPL (>= 3)

SystemRequirements gmp (>= 4.1)

Imports Hmisc(>= 4.6-0), Cairo(>= 1.5-14), ggplot2(>= 3.3.5), nlme(>= 3.1-152), tibble(>= 3.1.6)

Encoding UTF-8

RoxygenNote 7.1.2

Depends R (>= 2.10)

Suggests rmarkdown, knitr

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

Date/Publication 2022-04-24 15:50:02 UTC

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`forsearch-package` *Diagnostic Analysis Using Forward Search Procedure for Various Models Outlier Diagnostics for Some Linear Effects and Linear Mixed Effects Models*

Description

Identifies potential data outliers and their impact on estimates and analyses. Uses the forward search approach of Atkinson and Riani, "Robust Diagnostic Regression Analysis", 2000,<ISBN: o-387-95017-6>) to prepare descriptive statistics of a dataset that is to be analyzed by stats::lm(), stats::glm(), or nlme::lme(). Includes graphics functions to display the descriptive statistics.

Details

The DESCRIPTION file:

Package:	forsearch
Version:	2.3.0
Title:	Outlier Diagnostics for Some Linear Effects and Linear Mixed Effects Models
Authors@R:	person("William","Fairweather", email = "wrf343@flowervalleyconsulting.com", role = c("aut", "cre'
Description:	Identifies potential data outliers and their impact on estimates and analyses. Uses the forward search a
License:	GPL (>= 3)
SystemRequirements:	gmp (>= 4.1)
Imports:	Hmisc(>= 4.6-0), Cairo(>= 1.5-14), ggplot2(>= 3.3.5), nlme(>= 3.1-152), tibble(>= 3.1.6)
Encoding:	UTF-8
Roxygen:	list(markdown = TRUE)
RoxygenNote:	7.1.2
Depends:	R (>= 2.10)
LazyData:	TRUE

Suggests:	rmarkdown, knitr
VignetteBuilder:	knitr
Author:	William Fairweather [aut, cre]
Maintainer:	William Fairweather <wrf343@flowervalleyconsulting.com>

Index of help topics:

forsearch-package	Diagnostic Analysis Using Forward Search Procedure for Various Models Outlier Diagnostics for Some Linear Effects and Linear Mixed Effects Models
forsearch_glm	Create Statistics Of Forward Search in a Generalized Linear Model Database
forsearch_lm	Create Statistics Of Forward Search in a Linear Model Database
forsearch_lme	Create Statistics Of Forward Search In a Linear Mixed Effects Database
identifyCoeffs	Index To Identify Fixed and Random Coefficients To Appear Together on Plot
identifyFixedCoeffs	Index To Identify Fixed Coefficients To Appear Together on Plot
plotdiag.AICX	Plot Diagnostic AIC Statistics
plotdiag.Cook	Plot Diagnostic Statistics of Modified Cook's Distance
plotdiag.deviance.residuals	Plot Diagnostic Statistics Of Deviance Residuals
plotdiag.deviances	Plot Diagnostic Deviance Statistics
plotdiag.fit3	Plot Diagnostic Statistics of AIC, BIC, and Log Likelihood
plotdiag.leverage	Plot Diagnostic Statistics Of Leverage
plotdiag.params.fixed	Plot Diagnostic Statistics of Fixed Coefficients
plotdiag.params.random	Plot Diagnostic Statistics Of Random Coefficients
plotdiag.phihatx	Plot Diagnostic PhiHat Statistics
plotdiag.residuals	Plot Diagnostic Statistics Of Residuals Or Squared Residuals
plotdiag.s2	Plot Diagnostic Statistics Of Residual Variation
plotdiag.tstats	Plot Diagnostic T Statistics
search.history	Create Tabular History Of Forward Search
showme	Display Abbreviated Output Of FORSEARCH_LM Function
showmegl	Display Abbreviated Output Of FORSEARCH_GLM Function

showmelme	Display Abbreviated Output Of FORSEARCH_LME Function

Ensure that data frame has a leading column of observation numbers. Run forsearch_xxx to create a file of diagnostic statistics to be used as input to such plotting functions as plotdiag.residuals, plotdiag.params.fixed, plotdiag.params.random, plotdiag.s2, plotdiag,leverage, and plotdiag.Cook. The file of diagnostic statistics can be voluminous, and utility functions of showme, showmelme, and showmegl (for lm, lme and glm analyses, respectively) display the output more succinctly. Plotting of statistics for fixed and for random coefficients is limited by graphical restraints in some cases. The function identifyCoeffs provides a set of indexing codes so that plotdiag.params.random can display diagnostics for selected fixed or random model parameters. The function identifyFixedCoeffs does the same for lm models.

Author(s)

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Maintainer: NA William R. Fairweather <wrf343 at flowervalleyconsulting.com>

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000. Pinheiro, JC and DM Bates. Mixed-Effects Models in S and S-Plus, Springer, New York, 2000.

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forsearch_glm — *Create Statistics Of Forward Search in a Generalized Linear Model Database*

Description

Prepares summary statistics at each stage of forward search for subsequent plotting. Forward search is conducted in three steps: Step 1 to identify minimal set of observations to estimate unknown parameters, and Step 2 to add one observation at each stage such that observations in the set are best fitting at that stage. A preliminary step (Step 0) contains code for pre-processing of the data.

Usage

```
forsearch_glm(initial.sample, cobs, response.cols, indep.cols, family, data,
estimate.phi=TRUE, skip.step1=NULL, diagnose=FALSE, verbose=TRUE)
```

Arguments

initial.sample	Number of random sets of observations in Step 1 of forward search
cobs	Number of observations to include in each innermost subset of Step 1
response.cols	Column number(s) of response(s)
indep.cols	Column number(s) of independent variables
family	Error distribution and link

data	Name of database
estimate.phi	TRUE causes phi to be estimated; FALSE causes phi to be set = 1
skip.step1	NULL, or vector of observation numbers to include at end of Step 1
diagnose	TRUE causes printing of intermediate steps of function
verbose	TRUE causes function identifier to display before and after run

Details

No compounding of independent variables is performed within this function. Cross products of two or more variables, functions of single variables, etc. must be explicit and must be represented by another variable in the independent set.

Value

LIST

Rows in stage	Observation numbers of rows included at each stage
Family	Family and link
Number of model parameters	Number of fixed effect parameters
Fixed parameter estimates	Matrix of parameter estimates at each stage
Residual deviance	Vector of deviances
Null deviance	Vector of null deviances
PhiHat	Vector of values of phi parameter
Deviance residuals and augments	Deviance residuals with indication of whether each is included in fit
AIC	Vector of AIC values
Leverage	Matrix of leverage of each observation at each stage
Call	Call to this function

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`forsearch_lm` *Create Statistics Of Forward Search in a Linear Model Database*

Description

Prepares summary statistics at each stage of forward search for subsequent plotting. Forward search is conducted in two steps: Step 1 to identify minimal set of observations to estimate unknown parameters, and Step 2 to add one observation at each stage such that observations in the set are best fitting at that stage.

Usage

```
forsearch_lm(formula, data, initial.sample, diagnose = FALSE, verbose = TRUE)
```

Arguments

`formula`	Fixed effects formula as described in stats::lm
`data`	Name of database
`initial.sample`	Number of observations in Step 1 of forward search
`diagnose`	TRUE causes printing of intermediate steps of function
`verbose`	TRUE causes function identifier to display before and after run

Value

LIST

`Rows in stage`	Observation numbers of rows included at each stage
`Standardized residuals`	Matrix of errors at each stage
`Number of model parameters`	Rank of model
`Sigma`	Estimate of random error at final stage; used to standardize all residuals
`Fixed parameter estimates`	Matrix of parameter estimates at each stage
`s^2`	Estimate of random error at each stage
`Leverage`	Matrix of leverage of each observation at each stage
`Modified Cook distance`	Estimate of sum of squared changes in parameter estimates at each stage
`Call`	Call to this function

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`forsearch_lme` *Create Statistics Of Forward Search In a Linear Mixed Effects Database*

Description

Prepares summary statistics at each stage of forward search for subsequent plotting. Forward search is conducted in three steps: Step 0 to set up accounting for group structure, Step 1 to identify minimal set of observations to estimate unknown parameters, and Step 2 to add one observation at each stage such that observations in the set are best fitting at that stage.

Usage

```
forsearch_lme(fixed, data, random, formula, response.column, initial.sample, robs,
    skip.step1=NULL, XmaxIter = 1000, XmsMaxIter = 1000,
    Xtolerance = 0.01, XniterEM = 1000, XmsMaxEval = 400, XmsTol = 1e-05,
    Xopt = "optim", diagnose = FALSE, verbose = TRUE)
```

Arguments

`fixed`	2-sided formula for fixed effects
`data`	data frame, first column of which must be "Observation"
`random`	1-sided formula for random effects
`formula`	a formula of the form resp ~ cov | group where resp is the response, cov is the primary covariate, and group is the (non-nested) grouping factor
`response.column`	Column number of response variable
`initial.sample`	Number of observations in Step 1 of forward search
`robs`	Number of observations to include in Step 1 of forward search from each sub-group
`skip.step1`	NULL or a vector of integers for rows to be included in Step 1
`XmaxIter`	lme control parameter
`XmsMaxIter`	lme control parameter
`Xtolerance`	lme control parameter
`XniterEM`	lme control parameter
`XmsMaxEval`	lme control parameter

XmsTol	lme control parameter
Xopt	lme control parameter
diagnose	TRUE causes printing of intermediate steps of function
verbose	TRUE causes function identifier to display before and after run

Details

Group structure is ignored in calculating errors of fit in Step 1. That is, predictions derive from lm fit and not lme fit. Diagnostic statistics are obtained from lme fits. Argument 'formula' is used to identify the innermost group structure and the observations in each level.

Value

LIST

Rows in stage	Observation numbers of rows included at each stage
Standardized residuals	Matrix of errors at each stage
Number of model parameters	Rank of model
Sigma	Estimate of random error at final stage; used to standardize all residuals
Fixed parameter estimates	Matrix of parameter estimates at each stage
s^2	Estimate of random error at each stage
Leverage	Matrix of leverage of each observation at each stage
Modified Cook distance	Estimate of sum of squared changes in parameter estimates at each stage
Fit statistics	AIC, BIC, and log likelihood
Call	Call to this function

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000. Pinheiro, JC and DM Bates. Mixed-Effects Models in S and S-Plus, Springer, New York, 2000. https://CRAN.R-project.org/package=nlme

Examples

`identifyCoeffs` *Index To Identify Fixed and Random Coefficients To Appear Together on Plot*

Description

Runs the defined, grouped linear mixed effects (lme) model. Displays the resulting fixed and random coefficients. Attaches codes for identifying them to the plotting functions of this package.

Usage

```
identifyCoeffs(fixed, data, random,
    XmaxIter = 1000, XmsMaxIter = 1000,
    Xtolerance = 0.01, XniterEM = 1000, XmsMaxEval = 400, XmsTol = 1e-05,
    Xopt = "optim",
    diagnose = FALSE, verbose = TRUE)
```

Arguments

`fixed`	2-sided formula for fixed effects
`data`	Name of file (to be) run by forsearch_lme
`random`	1-sided formula for random effects
`XmaxIter`	lme control parameter
`XmsMaxIter`	lme control parameter
`Xtolerance`	lme control parameter
`XniterEM`	lme control parameter
`XmsMaxEval`	lme control parameter
`XmsTol`	lme control parameter
`Xopt`	lme control parameter
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Details

Plotting functions cannot plot more than a few coefficients on one graph. This function prepares an index of the coefficients so that the user can more easily identify which ones should appear together in a plot.

Value

Index of fixed and random coefficients from forsearch_lme.

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`identifyFixedCoeffs` *Index To Identify Fixed Coefficients To Appear Together on Plot*

Description

Runs the defined linear (lm) model. Displays the resulting coefficients. Attaches codes for identifying them to the plotting functions of this package.

Usage

```
identifyFixedCoeffs(formula, data, diagnose = FALSE, verbose = TRUE)
```

Arguments

`formula`	2-sided formula for fixed effects
`data`	Name of file (to be) run by forsearch_lm
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Details

Plotting functions cannot plot more than a few coefficients on one graph. This function prepares an index of the coefficients so that the user can more easily identify which ones should appear together in a plot.

Value

Index of coefficients from forsearch_lm.

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

plotdiag.AICX *Plot Diagnostic AIC Statistics*

Description

Plot output from forsearch_glm to show change in AIC statistics as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.AICX(forn, maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption title here",
wmf = "Put_plot_file_title_here",
Cairo=TRUE, printgraph=TRUE,loess = FALSE,
diagnose = FALSE,verbose = TRUE)
```

Arguments

forn	Name of output file from forsearch_glm
maintitle	Main title of plot
subtitle	Subtitle of plot
caption	Content of caption
wmf	File name of stored plot; omit '.wmf'
Cairo	TRUE causes use of Cairo graphics
printgraph	TRUE causes graph to print to file and closes device
loess	TRUE causes plot of loess line, otherwise straight line
diagnose	If TRUE, displays code to help diagnose main function errors
verbose	If TRUE, indicates beginning and end of function

Value

Process and plot AIC statistics from forsearch_glm

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

plotdiag.Cook *Plot Diagnostic Statistics of Modified Cook's Distance*

Description

Plot output from forsearch_lm or forsearch_lme to show change in Modified Cook's distance as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.Cook(forn, maintitle = "Put main title here", subtitle = "Put subtitle here",
caption = "Put caption here", wmf = "Put_plot_file_title_here",
Cairo=TRUE,printgraph=TRUE, loess = FALSE,
diagnose = FALSE, verbose = TRUE)
```

Arguments

forn	Name of forward search output file
maintitle	Main title of plot
subtitle	Subtitle of plot
caption	Content of caption
wmf	File name of stored plot; omit ".wmf"
Cairo	TRUE causes use of Cairo graphics
printgraph	TRUE causes graph to print to file and closes device
loess	If TRUE, adds loess curve to plot, otherwise, straight line
diagnose	If TRUE, displays code to help diagnose main function errors
verbose	If TRUE, indicates beginning and end of function

Value

Process and plot Cook distance statistics from forsearch_lm or forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

plotdiag.deviance.residuals
Plot Diagnostic Statistics Of Deviance Residuals

Description

Plot output from forsearch_glm to show change in deviance residuals or augmented deviance residuals, either of which can be squared, as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.deviance.residuals(forn, squared = FALSE, augmented=TRUE, hilos = c(1, 0),
maintitle="Put main title here", subtitle="Put subtitle here", caption="Put caption here",
wmf= "Put_graph_title_here", Cairo=TRUE,printgraph=TRUE,
legend = "Dummy legend name", diagnose = FALSE,verbose = TRUE)
```

Arguments

forn	Name of forward search output file
squared	TRUE causes residuals to be squared before plotting
augmented	TRUE causes graphing of augmented deviance residuals, see Details
hilos	Number of observations having high and number having low values of residuals to identify. No low values are identified for squared residual plot
maintitle	Main title of plot
subtitle	Subtitle of plot
caption	Caption of plot
wmf	File name of stored plot; omit ".wmf"
Cairo	TRUE causes use of Cairo graphics
printgraph	TRUE causes graph to print to file and closes device
legend	Legend title
diagnose	If TRUE, displays code to help diagnose main function errors
verbose	If TRUE, indicates beginning and end of function

Details

We reserve the use of the term 'Deviance residuals' to deviance residuals of the observations that were used to create the model fit, and use the term 'Augmented deviance residuals' to refer to deviance residuals of all available observations. The latter are created by predicting the fit of the model to all observations.

Value

Process and plot changes in deviance residuals or squared deviance residuals from forsearch_glm

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.deviances` *Plot Diagnostic Deviance Statistics*

Description

Plot output from forsearch_glm to show change in deviances as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.deviances(forn, devtype, maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption here",
wmf = "Put_plot_file_title_here",
Cairo=TRUE, printgraph=TRUE,loess=FALSE,
diagnose = FALSE,verbose = TRUE)
```

Arguments

`forn`	Name of output file from forsearch_glm
`devtype`	Type of deviance: "R" or "N" for Residual deviance or Null deviance
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`loess`	If TRUE, loess line is drawn through points, otherwise straight line
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot deviances from forsearch_glm

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

---

plotdiag.fit3 *Plot Diagnostic Statistics of AIC, BIC, and Log Likelihood*

Description

Plot output from forsearch_lme to show change in AIC, BIC, and log likelihood as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.fit3(forn, maintitle = "Put main title here", subtitle = "Put subtitle here",
    caption = "Put caption here", wmf = "Put_graph_filename_here",
    Cairo=TRUE,printgraph=TRUE, legend="Dummy legend name",
    diagnose = FALSE, verbose = TRUE)
```

Arguments

forn	Name of output file from forsearch_lm
maintitle	Main title of plot
subtitle	Subtitle of plot
caption	Content of caption
wmf	File name of stored plot; omit ".wmf"
Cairo	TRUE causes use of Cairo graphics
printgraph	TRUE causes graph to print to file and closes device
legend	Legend name
diagnose	If TRUE, displays code to help diagnose main function errors
verbose	If TRUE, indicates beginning and end of function

Value

Process and plot trends of AIC, BIC, and log likelihood statistics from forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.leverage` *Plot Diagnostic Statistics Of Leverage*

Description

Plot output from forsearch_lm or forsearch_lme to show change in leverage of each observation as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.leverage(forn, hilos = c(1, 0), maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption here",wmf = "Put_graph_title_here",
Cairo=TRUE, printgraph = TRUE,diagnose = FALSE,verbose = TRUE)
```

Arguments

`forn`	Name of forward search output file
`hilos`	Vector with number of highest observations and number of lowest observations on graph to identify
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot Cook distance statistics from forsearch_lm or forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

---

plotdiag.params.fixed *Plot Diagnostic Statistics of Fixed Coefficients*

Description

Plot output from forsearch_xxx to show change in random coefficients as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.params.fixed(forn, coeff.codenums=NULL, maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption here",wmf = "Put_stored_name_here",
Cairo=TRUE, printgraph=TRUE,legend = "Dummy legend name",
diagnose = FALSE,verbose = TRUE)
```

Arguments

forn	Name of output file from forsearch_xxx
coeff.codenums	Numeric vector of coefficients to include together on the plot. Codes are output by identifyFixedCoeffs (for lm files) or by identifyCoeffs function (for lme files)
maintitle	Main title of plot
subtitle	Subtitle of plot
caption	Content of caption
wmf	File name of stored plot; omit ".wmf"
Cairo	TRUE causes use of Cairo graphics
printgraph	TRUE causes graph to print to file and closes device
legend	Name of legend
diagnose	If TRUE, displays code to help diagnose main function errors
verbose	If TRUE, indicates beginning and end of function

Value

Process and plot fixed coefficient statistics from forsearch_lm or forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.params.random`

Plot Diagnostic Statistics Of Random Coefficients

Description

Plot output from forsearch_lme to show change in root mean squares of random coefficients as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.params.random(forn, coeff.codenums=NULL,
asfacets=FALSE, facetdir=c("h","v"),
maintitle = "Put maintitle here", subtitle = "Put subtitle here",
caption = "Put caption here",wmf = "Put_stored_name_here",
Cairo=TRUE,printgraph = TRUE,
legend = "Dummy legend name", diagnose = FALSE, verbose = TRUE)
```

Arguments

`forn`	Name of output file from forsearch_lme
`coeff.codenums`	columns of output file to be included in graph
`asfacets`	TRUE causes printing in facets
`facetdir`	"v" lays out the facets vertically, "h" lays them out horizontally
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`legend`	Name of legend
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot RMS of random coefficients from forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.phihatx` *Plot Diagnostic PhiHat Statistics*

Description

Plot output from forsearch_glm to show change in phiHat statistics as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.phihatx(forn, maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption here",
wmf = "Put_plot_file_title_here",
Cairo=TRUE, printgraph=TRUE,loess = FALSE,
diagnose = FALSE,verbose = TRUE)
```

Arguments

`forn`	Name of output file from forsearch_glm
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`loess`	TRUE causes print of loess line, otherwise straight line
`printgraph`	TRUE causes graph to print to file and closes device
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot phiHat statistics from forsearch_glm

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.residuals` *Plot Diagnostic Statistics Of Residuals Or Squared Residuals*

Description

Plot output from forsearch_lm or forsearch_lme to show change in residuals or squared residuals as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.residuals(forn, squared = FALSE, hilos = c(1, 0), maintitle, subtitle,
caption, wmf, Cairo=TRUE,printgraph=TRUE,
legend = "Dummy legend name", diagnose = FALSE, verbose = TRUE)
```

Arguments

`forn`	Name of forward search output file
`squared`	TRUE causes residuals to be squared before plotting
`hilos`	Number of observations having high and number having low values of residuals to identify. No low values are identified for squared residual plot.
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Caption of plot
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`legend`	Legend title
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot changes in residuals or squared residuals from forsearch_lm or forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.s2` *Plot Diagnostic Statistics Of Residual Variation*

Description

Plot output from forsearch_lm to show change in residual variation as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.s2(forn, maintitle = "Put main title here", subtitle = "Put subtitle here",
    caption = "Put caption here", wmf = "Put_graph_filename_here",
    Cairo=TRUE,printgraph=TRUE, loess = FALSE,
    diagnose = FALSE, verbose = TRUE)
```

Arguments

`forn`	Name of output file from forsearch_lm
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`loess`	If TRUE, adds loess curve to plot, otherwise, straight line
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot residual variation statistics from forsearch_lm

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`plotdiag.tstats` *Plot Diagnostic T Statistics*

Description

Plot output from forsearch_lm or forsearch_lme to show change in t statistics as the number of observations in the forward search procedure increases. Save plot in folder containing working directory.

Usage

```
plotdiag.tstats(forn, coeff.codenums=NULL, maintitle = "Put main title here",
subtitle = "Put subtitle here", caption="Put caption here", wmf = "Put_stored_name_here",
Cairo=TRUE, printgraph=TRUE,legend = "Dummy legend name",
diagnose = FALSE,verbose = TRUE)
```

Arguments

`forn`	Name of output file from forsearch_lm or forsearch_lme
`coeff.codenums`	Numeric vector of coefficients to include together on the plot. Codes are output by identifyFixedCoeffs (for lm files) or by identifyCoeffs function (for lme files)
`maintitle`	Main title of plot
`subtitle`	Subtitle of plot
`caption`	Content of caption
`wmf`	File name of stored plot; omit ".wmf"
`Cairo`	TRUE causes use of Cairo graphics
`printgraph`	TRUE causes graph to print to file and closes device
`legend`	Name of legend
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Process and plot t statistics of fixed coefficients from forsearch_lm or forsearch_lme

Author(s)

William R. Fairweather

References

Atkinson, A and M Riani. Robust Diagnostic Regression Analysis, Springer, New York, 2000.

Examples

`search.history` *Create Tabular History Of Forward Search*

Description

The forward search functions output a list of vectors, each of which indicates which observations are in the model at each stage of the search. This function processes that list to create a more easily understood matrix of the observation numbers that are newly entered into the model and any that were temporarily removed from the model over the course of the search.

Usage

```
search.history(list1, diagnose = FALSE, verbose = TRUE)
```

Arguments

`list1`	Name of a forsearch_xxx output file
`diagnose`	If TRUE, displays code to help diagnose main function errors
`verbose`	If TRUE, indicates beginning and end of function

Value

Printout of matrix showing evolution of observations to enter or leave the model during the course of the forward search

Author(s)

William R. Fairweather

Examples

showme *Display Abbreviated Output Of FORSEARCH_LM Function*

Description

Output of forsearch_lm function can be voluminous. This function displays the output in an abbreviated format. Primarily for programmer use.

Usage

```
showme(x, verbose = TRUE)
```

Arguments

x	Name of forsearch_lm output file
verbose	If TRUE, indicates the beginning and end of function run

Value

Abbreviated printout of output of forsearch_lm function

Author(s)

William R. Fairweather

Examples

showmegl *Display Abbreviated Output Of FORSEARCH_GLM Function*

Description

Output of forsearch_glm function can be voluminous. This function displays the output in an abbreviated format. Primarily for programmer use.

Usage

```
showmegl(x, verbose = TRUE)
```

Arguments

x	Name of forsearch_glm output file
verbose	If TRUE, indicates the beginning and end of function run

Value

Abbreviated printout of output of forsearch_glm function

Author(s)

William R. Fairweather

Examples

`showmelme` *Display Abbreviated Output Of FORSEARCH_LME Function*

Description

Output of forsearch_lme function can be voluminous. This function displays the output in an abbreviated format. Primarily for programmer use.

Usage

```
showmelme(x, verbose = TRUE)
```

Arguments

`x`	Name of forsearch_lme output file
`verbose`	If TRUE, indicates the beginning and end of function run

Value

Abbreviated printout of output of forsearch_lme function

Author(s)

William R. Fairweather

Examples

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