

Package ‘ltsbase’

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Type Package

Title Ridge and Liu Estimates based on LTS (Least Trimmed Squares) Method

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Author Betul Kan Kilinc [aut, cre], Ozlem Alpu [aut, cre]

Maintainer Betul Kan Kilinc <bkan@anadolu.edu.tr>

Description This is a new tool to estimate Ridge and Liu estimators based on LTS method in multiple linear regression analysis.

Repository CRAN

License GPL-3

Depends MASS, robustbase

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 ltsbase-package

Ridge and Liu Estimates based on LTS Method

Description

This is a package that gives the estimates of Ridge and Liu parameters based on LTS method in multiple linear regression analysis. It can be also used to compare the biasing parameters obtained from Ridge regression, Ridge based on LTS method, Liu, and Liu based on LTS method. It measures the performance of the models according to MSE and extract the biasing parameter at minimum MSE. Additionally, it is possible to compare the MSE values of the four regression models on a plot.

Details

Package: Itsbase
 Type: Package
 Version: 1.0.1
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ltsbase package has a main function called ltsbase and also two other useful functions called ltsbaseDefault and ltsbaseSummary. The function ltsbase computes the minimum MSE values for Ordinary Least Squares, Ridge, Ridge based on LTS, LTS, Liu, Liu based on LTS method. The second function ltsbaseDefault is used to get the fitted values and residuals of the corresponding model. The last function ltsbaseSummary is used to get the regression coefficients and the biasing parameter for the best MSE among four regression models.

Author(s)

Betul Kan Kilinc <bkan@anadolu.edu.tr>; Ozlem Alpu <oalpu@ogu.edu.tr>. We are grateful to Berna Yazici for various suggestions and contributions.

 ltsbase

Ridge and Liu Estimates based on LTS Method

Description

Returns the estimates of the Ridge and Liu parameters based on LTS Method.

Usage

```
ltsbase(xdata, y, print = FALSE, plot = FALSE, alpha = 0.5, by = 0.001)
```

Arguments

<code>xdata</code>	a data frame of predictors.
<code>y</code>	response variable.
<code>print</code>	if TRUE then the user may see all the calculation results.
<code>plot</code>	if TRUE then the lines of all MSE values versus biasing parameters are plotted.
<code>alpha</code>	the percentage of squared residuals whose sum will be minimized.
<code>by</code>	the increment of the sequence with default 0.001.

Value

<code>list.mse</code>	a list of the minimum MSE values. The MSE values are computed in the sequence of the biasing parameter for each regression model.
<code>list.bias.par</code>	list of the biasing parameters at the minimum MSE values obtained by <code>list.mse</code> .
<code>list.coef.all</code>	coefficients of the models at the corresponding biasing parameters obtained by <code>list.bias.par</code> and the coefficients of the OLS and LTS as well.

Source

B. Kan, O. Alpu, B. Yazici (2013) Robust ridge and Liu estimator for regression based on the LTS estimator. *Journal of Applied Statistics*. 40(3), 644-655.

References

- G. Pison, S. Van Aelst, and G. Willems (2002) Small sample corrections for LTS and MCD, *Metrika*, 55, 111-123.
- P.J. Rousseeuw (1983) Multivariate estimation with high breakdown point, *The Fourth Pannonian Symposium on Mathematical Statistics and Probability*, Bad Tatzmannsdorf, Austria.
- P.J. Rousseeuw and A. M. Leroy (1987) *Robust Regression and Outlier Detection*, Wiley, New York.
- P.J. Rousseeuw and K. Van Driessen (1999) Computing LTS regression for large data sets, *Tech. Rep.*, Statistics Group, University of Antwerp, Antwerp, Belgium.

See Also

[ltsbaseSummary](#), [ltsbaseDefault](#)

Examples

```
data(hbk)
y=hbkc[,4]
xdata=data.frame(hbkc[,1:3])
model=ltsbase(xdata, y, print=FALSE, plot=TRUE, alpha=0.875, by=0.001)
```

ltsbaseDefault	<i>Fitting the Ridge and Liu Regression Models based on LTS Method</i>
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Description

Returns the fitted values and the residuals of the model having minimum MSE.

Usage

```
ltsbaseDefault(xdata, y, alpha = alpha, by = by)
```

Arguments

xdata	a data frame of regressors.
y	y response variable.
alpha	the percentage of squared residuals whose sum will be minimized. Alpha must be between 0.5 and 1.
by	the increment of the sequence.

Value

fitted.val	fitted values of the corresponding model.
res	residuals of the corresponding model.

ltsbaseSummary	<i>Summarizing the results of the best model</i>
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Description

Returns and lists the minimum MSE value, the biasing parameter obtained at that minimum MSE value and extract the coefficients of the corresponding regression model given in object.

Usage

```
ltsbaseSummary(object)
```

Arguments

object	an object of class "ltsbase", usually, a result of a call to ltsbase .
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Details

The model fitted includes no intercept term. ltsbaseSummary computes the modified MSE for Ridge and Liu estimates based on LTS method.

References

There are other MSE comparisons of the estimators such as:

F. Akdeniz and H. Erol (2003) Mean squared error matrix comparisons of some biased estimators in linear regression, *Comm. Statist. Theory Methods*, 32, 2389-2413.

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