Package 'robsel'

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Type Package

Title Robust Selection Algorithm

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Description An implementation of algorithms for estimation of the graphical lasso regularization parameter described in Pedro Cisneros-Velarde, Alexander Petersen and Sang-Yun Oh (2020) <http://proceedings.mlr.press/v108/cisneros20a.html>.

BugReports https://github.com/dddlab/robust-selection/issues

License GPL-2

Encoding UTF-8

Imports glasso, Rcpp

Suggests knitr, rmarkdown

VignetteBuilder knitr

RoxygenNote 7.1.1

LinkingTo Rcpp, RcppEigen

NeedsCompilation yes

Author Chau Tran [aut, cre],
Sang-Yun Oh [aut],
Pedro Cisneros-Velarde [aut],
Alexander Petersen [aut]

Maintainer Chau Tran <chautran@ucsb.edu>

Repository CRAN

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Contents

robsel *Robust Selection*

Description

Robust Selection algorithm for estimation of the regularization parameter for Graphical Lasso

Usage

```
robsel(x, alpha = 0.9, B = 200)
```

Arguments

x	A n-by-p data matrix
alpha	Prespecified confidence level. Default 0.9
B	Number of bootstrap sample. Default 200

Value

lambda Estimation of the regularization parameter for Graphical Lasso. A vector of lambda will be return if more than 1 value of alpha is provided.

References

P Cisneros-Velarde, A Petersen and S-Y Oh (2020). Distributionally Robust Formulation and Model Selection for the Graphical Lasso. Proceedings of the Twenty Third International Conference on Artificial Intelligence and Statistics.

See Also

robsel.glasso for using Graphical Lasso algorithm with estimate regularization parameter lambda from Robust Selection.

Examples

```
set.seed(17)
library(robsel)
x <-matrix(rnorm(50*20),ncol=20)

#Compute estimation of lambda at confidence level alpha
lambda <- robsel(x = x, alpha = 0.9, B = 200)
```

`robsel.glasso` *Fit Graphical Lasso with RobSel*

Description

Fit Graphical Lasso with estimate regularization parameter from Robust Selection

Usage

```
robsel.glasso(x, alpha = 0.9, B = 200, ...)
```

Arguments

`x`	A n-by-p data matrix
`alpha`	Prespecified confidence level. Default 0.9
`B`	Number of bootstrap sample. Default 200
`...`	Optional arguments passed on to glasso.

Value

A list with components:

`alpha`	A list of prespecified confidence level
`lambda`	A list of estimate regularization parameter for Graphical Lasso
`Omega`	A list of estimated inverse covariance matrix
`Sigma`	A list of estimated covariance matrix

Note

Each item in each component corresponds to a prespecified level alpha.

References

P Cisneros-Velarde, A Petersen and S-Y Oh (2020). Distributionally Robust Formulation and Model Selection for the Graphical Lasso. Proceedings of the Twenty Third International Conference on Artificial Intelligence and Statistics.

Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. 'Sparse inverse covariance estimation with the graphical lasso.' *Biostatistics* 9.3 (2008): 432-441.

Meinshausen, Nicolai and Buhlmann, Peter. 2006. 'High-Dimensional Graphs and Variable Selection with the Lasso.' *The Annals of Statistics*. JSTOR: 1436-1462.

Witten, Daniela M, Friedman, Jerome H, and Simon, Noah. 2011. 'New Insights and Faster computations for the Graphical Lasso.' *Journal of Computation and Graphical Statistics*. Taylor and Francis: 892-900.

See Also

robsel for Robust Selection algorithm, glasso for Graphical Lasso algorithm.

Examples

```
set.seed(17)
library(robsel)
x <-matrix(rnorm(50*20),ncol=20)

#Use Graphical Lasso with estimate regularization parameter lambda from RobSel
fit <- robsel.glasso(x = x, alpha = 0.9, B = 200)
```

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