

Package ‘robsel’

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Type Package

Title Robust Selection Algorithm

Version 0.1.0

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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>

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Encoding UTF-8

Imports glasso, Rcpp

Suggests knitr, rmarkdown

VignetteBuilder knitr

RoxygenNote 7.1.1

LinkingTo Rcpp, RcppEigen

NeedsCompilation yes

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R topics documented:

robsel	2
robsel.glasso	3
Index	5

`robse1`*Robust Selection*

Description

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

Usage

```
robse1(x, alpha = 0.9, B = 200)
```

Arguments

<code>x</code>	A n-by-p data matrix
<code>alpha</code>	Prespecified confidence level. Default 0.9
<code>B</code>	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

[robse1.glasso](#) for using Graphical Lasso algorithm with estimate regularization parameter lambda from Robust Selection.

Examples

```
set.seed(17)
library(robse1)
x <- matrix(rnorm(50*20), ncol=20)

#Compute estimation of lambda at confidence level alpha
lambda <- robse1(x = x, alpha = 0.9, B = 200)
```

robse1.glasso

*Fit Graphical Lasso with RobSel***Description**

Fit Graphical Lasso with estimate regularization parameter from Robust Selection

Usage

```
robse1.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

[robse1](#) for Robust Selection algorithm, [glasso](#) for Graphical Lasso algorithm.

Examples

```
set.seed(17)
library(robse1)
x <-matrix(rnorm(50*20),ncol=20)

#Use Graphical Lasso with estimate regularization parameter lambda from RobSel
fit <- robse1.glasso(x = x, alpha = 0.9, B = 200)
```

Index

glasso, 4

robse1, 2, 4

robse1.glasso, 2, 3