Package 'glassoFast'

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Type Package

Title Fast Graphical LASSO

Version 1.0.1

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Suggests glasso, rbenchmark

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Description A fast and improved implementation of the graphical LASSO.

License GPL (>= 3)

NeedsCompilation yes

Repository CRAN

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Contents

`glassoFast-package` *glassoFast: a Fast Graphical LASSO*

Description

This package propose a fast implementation of the graphical LASSO of Friedman et al. 2008 based on the algorithm (FORTRAN subroutine) of Sustik and Calderhead (2012). This algorithm also avoid non-termination issues observed for the "glasso" function of the R package glasso.

Details

Package:	glassoFast
Type:	Package
Version:	1.0.1
Date:	2017-06-07
License:	GPL (>=3.0)

The original FORTRAN Subroutine was taken from (now broken link):

http://www.cs.utexas.edu/users/sustik/glassofast/

Author(s)

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References

Friedman J., Hastie T., Tibshirani R. 2008. Sparse inverse covariance estimation with the graphical lasso. Biostatistics. 9:432-441.

Sustik M.A., Calderhead B. 2012. GLASSOFAST: An efficient GLASSO implementation. UTCS Technical Report TR-12-29:1-3.

See Also

glassoFast

`glassoFast` *Fast graphical LASSO*

Description

This function is a faster alternative to the "glasso" function in the glasso package (Friedman et al. 2008). This package uses the algorithm (FORTRAN subroutine) of Sustik and Calderhead (2012).

Usage

```
glassoFast(S, rho, thr = 1e-04, maxIt = 10000, start = c("cold", "warm"),
w.init = NULL, wi.init = NULL, trace = FALSE)
```

Arguments

S	Covariance matrix (a p by p symmetric matrix)
rho	The regularization parameter for lasso. (a non-negative value or a p by p matrix of regularization parameters)
thr	Threshold for convergence. Default is 1.e-4.
maxIt	Maximum number of iterations of outer loop. Default is 10,000.
start	Type of start. Cold start is default. Using warm start, can provide starting values for w and wi.
w.init	Optional starting values for estimated covariance matrix (p by p). Only needed when start="warm" is specified
wi.init	Optional starting values for estimated inverse covariance matrix (p by p). Only needed when start="warm" is specified
trace	Flag for printing out information as iterations proceed. Default FALSE.

Details

Estimate a sparse inverse covariance matrix using a lasso (L1) penalty, following the Friedman et al. (2008) approach. The function is a wrapper of the faster and corrected (for non-termination convergence issues) FORTRAN subroutine of Sustik and Calderhead (2012).

Value

w	Estimated covariance matrix
wi	Estimated inverse covariance matrix
errflag	Memory allocation error flag: 0 means no error; !=0 means memory allocation error
niter	Number of iterations of outer loop

Author(s)

Julien Clavel

References

Friedman J., Hastie T., Tibshirani R. 2008. Sparse inverse covariance estimation with the graphical lasso. Biostatistics. 9:432-441.

Sustik M.A., Calderhead B. 2012. GLASSOFAST: An efficient GLASSO implementation. UTCS Technical Report TR-12-29:1-3.

See Also

glasso

Examples

```
set.seed(100)

# Make a random covariance matrix
p=5
x<-matrix(rnorm(p*p),ncol=p)
s<- var(x)

# Compute the LASSO estimates
glassoFast(s, rho=.1)

# compare with glasso

 require(glasso)
 glasso(s, rho=.1)

# benchmark glassoFast and glasso
 require(rbenchmark)
 p=100
 x<-matrix(rnorm(p*p),ncol=p)
 s<- var(x)
 benchmark(glassoFast(s, rho=.15), glasso(s, rho=.15), replications = 100)
 # up to an order of magnitude faster
```

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