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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R topics documented:

`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)

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References

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

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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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