Package ‘FACTMLE’

October 12, 2022

Type Package

Title Maximum Likelihood Factor Analysis

Version 1.1

Date 2015-11-04

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Description Perform Maximum Likelihood Factor analysis on a covariance matrix or data matrix.

License GPL-3

Imports rARPACK, stats

Suggests MASS

RoxygenNote 5.0.0

NeedsCompilation no

Repository CRAN

Date/Publication 2015-11-21 15:56:06

R topics documented:

Factmle .............................................................. 1
Factmle_cov ........................................................ 3

Index 5

Factmle                      Calculates the Maximum likelihood Factor analysis with a dataset.

Description

Calculates the Maximum likelihood Factor analysis with a dataset.
Factmle

Usage

Factmle(data, rnk, Psi_init = c(), lb = 0.01, index = c(), lb2 = 0.01,
tol = 10^-7, Max_iter = 1000)

Arguments

data
The dataset. It is a n*p numeric matrix, where n is the number of observations
and p is the number of variables.

rnk
Rank constraint for the Factor analysis problem. It must a positive integer less
than the number of variables p

Psi_init
The initial value of Psi. It is a p*1 numeric vector, where p is the number of
variables. Default value is a vector of uniform random numbers.

lb
The lower bound on the Psi values. The default value is set to 0.05

index
This option is for modified version of factmle. The default value is a null vector.
If assigned a zero vector, it will perform MLFA keeping some of the Psi values
specified by the index at a specified level *lb2*

lb2
This option of modified version of factmle algorithm. The default value is 0.001.
The Psi values specified by the *index* is kept constant at *lb2* while doing
MLFA.

tol
Precision parameter. Default is 10^-7

Max_iter
Maximum number of iterations. Default is 1000.

Value

A list with the following components

Psi
A vector containing the unique variances.

Lambda
A p*rnk matrix containing the factor loadings in the columns.

Nll
A vector containing the negative Log-likelihood values at every iteration.

Nll_0pt
The value of the negative log-likelihood upon convergence.

See Also

svds

Examples

library(MASS)
library(stats)
Psi=runif(15,min=0.2,max=1.3)
Lambda=mvrnorm(n=15,mu=rep(0,3),Sigma = diag(rep(1,3)))
data=mvrnorm(n=5000,mu=rep(0,15),Sigma = diag(Psi)+Lambda%*%t(Lambda))
x=Factmle(data,3)
Factmle_cov

Calculates the Maximum likelihood Factor analysis with a covariance Matrix.

Description

Calculates the Maximum likelihood Factor analysis with a covariance Matrix.

Usage

Factmle_cov(S, rnk, Psi_init = c(), lb = 0.01, index = c(), lb2 = 0.01, 
    tol = 10^-7, Max_iter = 1000)

Arguments

S
The Covariance Matrix. It is a p*p numeric matrix, where p is the number of variables.

rnk
Rank constraint for the Factor analysis problem. It must a positive integer less than the number of variables p

Psi_init
The initial value of Psi. It is a p*1 numeric vector, where p is the number of variables. Default value is a vector of uniform random numbers.

lb
The lower bound on the Psi values. The default value is set to 0.05

index
This option is for modified version of factmle. The default value is a null vector. If assigned a zero vector, it will perform MLFA keeping some of the Psi values specified by the index at a specified level *lb2*

lb2
This option of modified version of factmle algorithm. The default value is 0.001. The Psi values specified by the *index* is kept constant at *lb2* while doing MLFA.

tol
Precision parameter. Default is 10^-7

Max_iter
Maximum number of iterations. Default is 1000.

Value

A list with the following components

Psi
A vector containing the unique variances.

Lambda
A p*rnk matrix containing the factor loadings in the columns.

Nll
A vector containing the negative Log-likelihood values at every iteration.

Nllopt
The value of the negative log-likelihood upon convergence.

See Also

eigs_sym
Examples

```r
library(MASS)
library(stats)
Psi=runif(15,min=0.2,max=1.3)
Lambda=mvrnorm(n=15,mu=rep(0,3),Sigma = diag(rep(1,3)))
data=mvrnorm(n=5000,mu=rep(0,15),Sigma = diag(Psi)+Lambda%*%t(Lambda))
S=cov(data)
x=Factmle_cov(S,3)
```
Index

Factmle, 1
Factmle_cov, 3