

Package ‘DLEGFM’

February 22, 2024

Type Package

Version 0.4.0

Title Distributed Loading Estimation for General Factor Model

Depends R (>= 3.5.0)

Suggests testthat (>= 3.0.0)

Description The load estimation method is based on a general factor model to solve the estimates of load and specific variance. The philosophy of the package is described in Guangbao Guo. (2022). <[doi:10.1007/s00180-022-01270-z](https://doi.org/10.1007/s00180-022-01270-z)>.

License MIT + file LICENSE

Encoding UTF-8

RoxygenNote 7.2.3

Imports elasticnet, stats

LazyData true

Config/testthat/edition 3

NeedsCompilation no

Author Guangbao Guo [aut, cre, cph],
Yaping Li [aut]

Maintainer Guangbao Guo <ggb11111111@163.com>

Repository CRAN

Date/Publication 2024-02-22 21:00:07 UTC

R topics documented:

BIPC	2
DBIPC	3
DFanPC	4
DGaoPC	4
DGulPC	5
DJIA	6
DPC	7

DPPC	8
FanPC	8
GaoPC	9
GulPC	10
ISE	11
PC	12
PPC	12
SECI	13
SPP	14

Index	16
--------------	-----------

BIPC	<i>Loading Estimation for General Factor Model</i>
------	--

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

```
BIPC(data,m)
```

Arguments

data	The data is total data set
m	The m is the number of first layer principal component

Value

ABr	estimation of load value
ABc	estimation of load value
DBr	estimation of error term
DBc	estimation of error term
SigmaB1hat	estimation of covariance
SigmaB2hat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
BIPC(data=ISE,m=3)
```

DBIPC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

```
DBIPC(data,m,n1,K)
```

Arguments

data	The data is total data set
m	The m is the number of first layer principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

ABr	estimation of load value
ABc	estimation of load value
DBr	estimation of error term
DBc	estimation of error term
SigmaB1hat	estimation of covariance
SigmaB2hat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
DBIPC(data=ISE,m=3,n1=107,K=5)
```

 DFanPC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

DFanPC(data,m,n1,K)

Arguments

data	The data is total data set
m	The m is the number of principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

AF	estimation of load value
DF	estimation of error term
SigmahatF	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

DFanPC(data=ISE,m=3,n1=107,K=5)

 DGaoPC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

DGaoPC(data,m,n1,K)

Arguments

data	The data is total data set
m	The m is the number of first layer principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

AG1	estimation of load value
AG2	estimation of load value
DG1	estimation of error term
DG2	estimation of error term
SigmahatG1	estimation of covariance
SigmahatG2	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

DGaoPC(data=ISE, m=3, n1=107, K=5)

DGu1PC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

DGu1PC(data, m, n1, K)

Arguments

data	The data is total data set
m	The m is the number of first layer principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

AU1	estimation of load value
AU2	estimation of load value
DU3	estimation of error term
S1hat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
DGu1PC(data=ISE, m=3, n1=107, K=5)
```

DJIA

Dow Jones industrial average

Description

The Dow Jones industrial average (DJIA) data set.

Usage

```
data("DJIA")
```

Format

GAS.F a numeric vector
 Nikkei.F a numeric vector
 NZD a numeric vector
 silver.F a numeric vector
 RUSSELL.F a numeric vector
 S.P.F a numeric vector
 CHF a numeric vector
 Dollar.index.F a numeric vector
 Dollar.index a numeric vector
 wheat.F a numeric vector
 XAG a numeric vector
 XAU a numeric vector

Details

The data set comes from the Dow Jones industrial average (PSA) data of 96 patients collected by Stanford University Medical Center. These patients all underwent radical prostatectomy.

Source

The Stanford University Medical Center.

References

NA

Examples

```
data(DJIA)
## maybe str(DJIA) ; plot(DJIA) ...
```

DPC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

```
DPC(data,m,n1,K)
```

Arguments

data	The data is total data set
m	The m is the number of first layer principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

Ahat	estimation of load value
Dhat	estimation of error term
Sigmahat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
DPC(data=ISE,m=3,n1=107,K=5)
```

DPPC

Distributed Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

DPPC(data, m, n1, K)

Arguments

data	The data is total data set
m	The m is the number of first layer principal component
n1	The n1 is the length of each data subset
K	The K is the number of nodes

Value

Apro	estimation of load value
Dpro	estimation of error term
Sigmahatpro	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

DPPC(data=ISE, m=3, n1=107, K=5)

FanPC

Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

FanPC(data, m)

Arguments

data	The data is total data set
m	The m is the number of principal component

Value

AF	estimation of load value
DF	estimation of error term
SigmahatF	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
FanPC(data=ISE, m=3)
```

GaoPC

Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

```
GaoPC(data, m)
```

Arguments

data	The data is total data set
m	The m is the number of principal component

Value

AG1	estimation of load value
AG2	estimation of load value
DG1	estimation of error term
DG2	estimation of error term
SigmahatG1	estimation of covariance
SigmahatG2	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
GaoPC(data=ISE,m=3)
```

GulPC

Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

```
GulPC(data,m)
```

Arguments

data	The data is total data set
m	The m is the number of first layer principal component

Value

AU1	estimation of load value
AU2	estimation of load value
DU3	estimation of error term
Shat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
GulPC(data=ISE,m=3)
```

ISE

Istanbul Stock Exchange

Description

The Istanbul Stock Exchange (ISE) data set.

Usage

```
data("ISE")
```

Format

ISE a numeric vector

SP a numeric vector

DAX a numeric vector

FTSE a numeric vector

NIKKEI a numeric vector

BOVESPA a numeric vector

EU a numeric vector

EM a numeric vector

Details

The data set comes from the Istanbul Stock Exchange (ISE) data of 96 patients collected by Stanford University Medical Center. These patients all underwent radical prostatectomy.

Source

The Stanford University Medical Center.

References

NA

Examples

```
data(ISE)  
## maybe str(ISE) ; plot(ISE) ...
```

PC

Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

PC(data,m)

Arguments

data	The data is a highly correlated data set
m	The m is the number of principal component

Value

Ahat	estimation of load value
Dhat	estimation of error term
Sigmahat	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

PC(data=ISE,m=3)

PPC

Loading Estimation for General Factor Model

Description

This function estimates the load and residual terms based on the general factor model and calculates the estimated values.

Usage

PPC(data,m)

Arguments

data	The data is total data set
m	The m is the number of principal component

Value

Apro	estimation of load value
Dpro	estimation of error term
Sigmahatpro	estimation of covariance

Author(s)

Guangbao Guo, Yaping Li

Examples

```
PPC(data=ISE,m=3)
```

SECI	<i>New York Stock Exchange Composite Index</i>
------	--

Description

The New York Stock Exchange Composite Index SECI(SECI) data set.

Usage

```
data("SECI")
```

Format

GBP a numeric vector
JPY a numeric vector
CAD a numeric vector
AAPL a numeric vector
AMZN a numeric vector
GE a numeric vector
JPM a numeric vector
MSFT a numeric vector
WFC a numeric vector
XOM a numeric vector
FCHI a numeric vector
FTSE a numeric vector
GDAXI a numeric vector

Details

The data set comes from the prostate specific antigen (PSA) data of 96 patients collected by Stanford University Medical Center. These patients all underwent radical prostatectomy.

Source

The Stanford University Medical Center.

References

NA

Examples

```
data(SECI)
## maybe str(SECI) ; plot(SECI) ...
```

SPP

Stock Portfolio Performance

Description

The Stock Portfolio Performance (SPP) data set.

Usage

```
data("SPP")
```

Format

X1 a numeric vector
X2 a numeric vector
X3 a numeric vector
X4 a numeric vector
X5 a numeric vector
X6 a numeric vector
X7 a numeric vector
X8 a numeric vector
X9 a numeric vector
X10 a numeric vector

Details

The data set comes from the Stock Portfolio Performance (SPP) data of 96 patients collected by Stanford University Medical Center. These patients all underwent radical prostatectomy.

Source

The Stanford University Medical Center.

References

NA

Examples

```
data(SPP)
## maybe str(SPP) ; plot(SPP) ...
```

Index

* datasets

DJIA, 6
ISE, 11
SECI, 13
SPP, 14

B1PC, 2

DB1PC, 3
DFanPC, 4
DGaoPC, 4
DGulPC, 5
DJIA, 6
DPC, 7
DPPC, 8

FanPC, 8

GaoPC, 9
GulPC, 10

ISE, 11

PC, 12
PPC, 12

SECI, 13
SPP, 14