

Package ‘DLEGFM’

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Type Package

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Title Distributed Loading Estimation for General Factor Model

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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)>.

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BIPC	<i>Loading Estimation for General Factor Model</i>
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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)
```

 DGulPC

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

```
DGulPC(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	<i>Dow Jones industrial average</i>
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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	<i>Distributed 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

```
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	<i>Loading Estimation for General Factor Model</i>
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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	<i>Loading Estimation for General Factor Model</i>
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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	<i>Loading Estimation for General Factor Model</i>
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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	<i>Istanbul Stock Exchange</i>
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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	<i>Stock Portfolio Performance</i>
-----	------------------------------------

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) ...
```

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