Package 'discFA'

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Type Package

Title Discrete Factor Analysis

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Description Discrete factor analysis for dependent Poisson and negative binomial models with truncation, zero inflation, and zero inflated truncation.

License GPL-3

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R topics documented:

`car_data` *Car data*

Description

This dataset contains 90 responses for 14 different variables that customers consider while purchasing car. The survey questions were framed using 5 point likert scale with 1 being very low and 5 being very high. The data can be downloaded from the given link. The variables are the following: 1. Price 2. Safety 3. Exterior looks 4. Space and comfort 5. Technology 6. After sales service 7. Resale value 8. Fuel type 9. Fuel efficiency 10. Color 11. Maintenance 12. Test drive 13. Product reviews 14. Testimonials

Usage

```
car_data
```

Format

Car data

Source

https://rpubs.com/harshaash/EFA

`dfnb` *Discrete factor analysis for the negative binomial distribution*

Description

Discrete factor analysis for the negative binomial distribution

Usage

```
dfnb(y)
```

Arguments

`y`	Data, an n by d numeric matrix

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estr0	Estimated value of r for the negative binomial distributed factor(s)
estp0	Estimated value of p for the negative binomial distributed factor(s)
estr	Estimated value of r for the negative binomial distributed observations(s)
estp	Estimated value of r for the negative binomial distributed observations(s)

Examples

```
dfnb(zinb100_Data[1:40,1:5])
```

---

dfnbt *Discrete factor analysis for the truncated negative binomial distribution (with right truncation at A)*

Description

Discrete factor analysis for the truncated negative binomial distribution (with right truncation at A)

Usage

```
dfnbt(y, A)
```

Arguments

y	Data, an n by d numeric matrix
A	truncation point (Note that if the data is in Likert scale starting from 1, then you should subtract 1 from the data and then use the proposed negative binomial models.

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estr0	Estimated value of r for the factor
estp0	Estimated value of p for the factor
estr	Estimated value of r for the observation
estp	Estimated value of r for the observation

Examples

```
dfnbt(zinb100_Data[1:40,1:3], A = 6)
```

dfp *Discrete factor analysis with the Poisson distribution*

Description

Discrete factor analysis with the Poisson distribution

Usage

```
dfp(y)
```

Arguments

y	Data, an n by d numeric matrix

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estlambda	Estimated parameters for factors
estmu	Estimated parameters for each variable within each factor

Examples

```
dfp(car_data[,2:9])
```

dfpt *Discrete factor analysis with the truncated Poisson distribution*

Description

Discrete factor analysis with the truncated Poisson distribution

Usage

```
dfpt(y, A = NULL)
```

Arguments

y	Data, an n by d numeric matrix
A	truncation point (Note that if the data is in Likert scale starting from 1, then you should subtract 1 from the data and then use the proposed negative binomial models.

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estlambda	Estimated parameters for factors
estmu	Estimated parameters for each variable within each factor

Examples

```
dfpt(y = car_data[,1:5], A = 5)
```

---

dfzinb *Discrete factor analysis with the zero inflated negative binomial distribution.*

Description

Discrete factor analysis with the zero inflated negative binomial distribution.

Usage

```
dfzinb(y, tol = 1e-06)
```

Arguments

y	Data, an n by d numeric matrix
tol	tolerance value for optimizations

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estpi0	Estimated value of p for the zero inflated part in the negative binomial distributed factor
estr0	Estimated value of r the negative binomial distributed factor(s)
estp0	Estimated value of p the negative binomial distributed factor(s)
estpi	Estimated parameters for the zero inflated part in the negative binomial distributed observations(s)
estr	Estimated value of r negative binomial distributed observations(s)
estp	Estimated value of p negative binomial distributed observations(s)

Examples

```
dfzinb(zinb100_Data[1:40,1:3])
```

`dfzinbt` *Discrete factor analysis with the zero inflated truncated negative binomial distribution.*

Description

Discrete factor analysis with the zero inflated truncated negative binomial distribution.

Usage

```
dfzinbt(y, A, tol = 1e-06)
```

Arguments

`y`	Data, an n by d numeric matrix
`A`	truncation point (Note that if the data is in Likert scale starting from 1, then you should subtract 1 from the data and then use the proposed negative binomial models.
`tol`	tolerance value for optimizations

Value

A list with entries.

`AIC`	AIC value for the optimal model
`indexmat`	Factors and variables in each factor
`estpi0`	Estimated value of p for the zero inflated part in the negative binomial distributed factor
`estr0`	Estimated value of r the negative binomial distributed factor(s)
`estp0`	Estimated value of p the negative binomial distributed factor(s)
`estpi`	Estimated parameters for the zero inflated part in the negative binomial distributed observations(s)
`estr`	Estimated value of r negative binomial distributed observations(s)
`estp`	Estimated value of p negative binomial distributed observations(s)

Examples

```
dfzinbt(zinb100_Data[1:20,1:3], A = 6)
```

dfzip — *Discrete factor analysis with the zero inflated Poisson distribution*

Description

Discrete factor analysis with the zero inflated Poisson distribution

Usage

```
dfzip(y)
```

Arguments

y	Data, an n by d numeric matrix

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estpilam	Estimated zero-inflated parameters for for each factor
estlam	Estimated parameters for each factor
estpimu	Estimated zero-inflated parameters for each variable within each factor
estmu	Estimated parameters for each variable within each factor

Examples

```
dfzip(car_data[,1:3])
```

dfzipt — *Discrete factor analysis with the truncated zero inflated Poisson distribution*

Description

Discrete factor analysis with the truncated zero inflated Poisson distribution

Usage

```
dfzipt(y, A = NULL)
```

Arguments

y	Data, an n by d numeric matrix
A	truncation point (Note that if the data is in Likert scale starting from 1, then you should subtract 1 from the data and then use the proposed negative binomial models.

Value

A list with entries

AIC	AIC value for the optimal model
indexmat	Factors and variables in each factor
estpilam	Estimated zero-inflated parameters for for each factor
estlam	Estimated parameters for each factor
estpimu	Estimated zero-inflated parameters for each variable within each factor
estmu	Estimated parameters for each variable within each factor

Examples

```
dfzipt(zinb100_Data[1:50,1:3], A = 6)
```

---

original_potato_data *Original potato data*

Description

This dataset contains 1152 observation with four variables that are either ordinal or counts. These variables are as follows: x1: Energy factor in the ordinal scale of 1 to 2 x2: weight in the ordinal scale of 1 to 3 x3: damage category in the ordinal scale of 1 to 4 x4: the count of tubers in each combination of categories as an integer value.

Usage

```
original_potato_data
```

Format

Original potato data

Source

https://cran.r-project.org/web/packages/agridat/index.html

potato_data *Potato data*

Description

TThis dataset contains 1152 observation with four variables (y1 to y4). We generated this data set from the original_potat_data by the following instruction to use for the discrete factor analysis:

$$y1 = x1 - min(x1)$$
$$y2 = max(x2) - x2$$
$$y3 = max(x3) - x3$$
$$y4 = x4.$$

Usage

```
potato_data
```

Format

Potato data

SCS_data *SCS data*

Description

The Sexual Compulsivity Scale (SCS) was developed to assess tendencies toward sexual preoccupation and hypersexuality. Items were initially derived from self-descriptions of persons who self-identify as having a 'sexual addiction'. The self-descriptors were taken from a brochure for a sexual addictions self-help group. The scale should predict rates of sexual behaviors, numbers of sexual partners, practice of a variety of sexual behaviors, and histories of sexually transmitted diseases. The data set were available at http://openpsychometrics.org/_rawdata/ and updated at 7/16/2012. The data set has 3376 observations with 13 variables of which 10 variables (Q1 to Q10) were the questions about the description of the sexual behaviour.

Usage

```
SCS_data
```

Format

SCS data

Source

http://openpsychometrics.org/_rawdata/

survey_data *Survey data*

Description

The questionnaire is five Likert scale data (strongly disagree (1) to strongly agree (5)). For some negative questions, the scale was reversed. We choose 13 variables (sample size = 435). Optimism Scale: opt1 to opt6. Mastery Scale: mast1 to mast7 to identity the hidden factors.

Usage

```
survey_data
```

Format

Survey data

Source

http://openpsychometrics.org/_rawdata/

zinb100_Data *zinb100 Simulated Data*

Description

100 Simulated samples from a zero-inflated truncated (truncation at 6) negative binomial process with (1,3,4,2) factor structure.

Usage

```
zinb100_Data
```

Format

zinb100_Data

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