# Package 'PsyControl'

## October 12, 2022

**Title** CUSUM Person Fit Statistics

**Version** 1.0.0.0

**Description** Person fit statistics based on Quality Control measures are provided for question-naires and tests given a specified IRT model. Statistics based on Cumula-tive Sum (CUSUM) charts are provided. Options are given for banks with polytomous and di-chotomous data.

**Depends** R (>= 3.3.3)

**License** GPL-2

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 6.0.1

**Imports** ltm, irtoys, stats, graphics

**NeedsCompilation** no

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**Repository** CRAN

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## R topics documented:

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| cusum | *Generates CUSUM values for Rasch, 2PL and 3PL IRT model based on the Van Krimpen-Stoop & Meijer, (2002).* |
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### Description

Generates CUSUM values for Rasch, 2PL and 3PL IRT model based on the Van Krimpen-Stoop & Meijer, (2002).

### Usage

```
cusum(dat, ipar = NULL, abi = NULL, IRTmodel = "2PL")
```

### Arguments

| | |
|---|---|
| dat | a nxp matrix with n participants and p items. Responses are in 0 1 format. |
| ipar | a pxk matrix with given item parameters p items and k item parameters. ipar[,1] discrimination; ipar[,2] item difficulty; ipar[,3] guessing-parameter. |
| abi | a vector n ability. If not provided, estimated using Expected a Posteriori method. |
| IRTmodel | specify the IRT model ("1PL", "2PL", "3PL"). Default is "2PL" |

### Value

Returns matrix with with lower and upper cusum statistics for dat.

### References

Van Krimpen-Stoop, E. M., & Meijer, R. R. (2002). Detection of person misfit in computerized adaptive tests with polytomous items. Applied Psychological Measurement, 26(2), 164-180.

### Examples

```
data(ex2PL)
cusum(dat = ex2PL)
```

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| cusum.cutoff | *Generates critical values for CUSUM statisitcs.* |
|---|---|

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### Description

cusum.cutoff Generates a bootstrap sample for cut-off scores.

### Usage

```
cusum.cutoff(cusum.obj, upp = 0.975, low = 0.025, Breps = 1000)
```

## Arguments

| | |
|---|---|
| cusum.obj | an object returned from cusum or cusum.poly |
| upp | user specified upper tail cut off. Default is .975 |
| low | user specified lower tail cut off. Default is .025 |
| Breps | number of bootstrap samples |

## Value

Returns a matrix of lower and upper cut off values and corresponding standard deviations based on bootstrap sample.

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| cusum.flag | *Flags aberrant participants based on CUSUM statistics.* |
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## Description

Flags aberrant participants based on CUSUM statistics.

## Usage

```
cusum.flag(cusum.obj, cutoff.obj, cut = NULL)
```

## Arguments

| | |
|---|---|
| cusum.obj | an object returned from cusum or cusum.poly |
| cutoff.obj | an object returned from cusum.cutoff |
| cut | a vector for user specified cut offs (e.g c(1,1)). The first value is the upper limit. The second value is the lower limit. |

## Value

Returns a true or false matrix whether a person is aberrantly responding.

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| cusum.plot | *Generates CUSUM plot for specified IDs.* |
|---|---|

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### Description

Generates CUSUM plot for specified IDs.

### Usage

```
cusum.plot(cu.object, ID)
```

### Arguments

| | |
|---|---|
| cu.object | an object returned from cusum or cusum.poly |
| ID | a numeric ID. |

### Value

Returns a plot for specified cusum person chart.

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| cusum.poly | *Generates CUSUM values for polytomous IRT model based on Van Krimpen-Stoop & Meijer, (2002).* |
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### Description

Generates CUSUM values for polytomous IRT model based on Van Krimpen-Stoop & Meijer, (2002).

### Usage

```
cusum.poly(dat, NCat, ipar = NULL, abi = NULL, IRTmodel = "GRM")
```

### Arguments

| | |
|---|---|
| dat | a nxp matrix with n participants and p items. Responses are in 0 as the lowest scores format. |
| NCat | number of categories for each item. |
| ipar | a pxk matrix with given item parameters p items and k item parameters. Item difficulty under the "GRM" or item steps under "PCM" or "GPCM" are in the first columns. The last column is the discrimination parameter. |
| abi | a vector n ability |
| IRTmodel | specify the IRT model ("GRM","PCM","GPCM"). Default is "GRM". |

## Value

Returns matrix with with lower and upper cusum statistics for `dat`.

## References

Van Krimpen-Stoop, E. M., & Meijer, R. R. (2002). Detection of person misfit in computerized adaptive tests with polytomous items. Applied Psychological Measurement, 26(2), 164-180.

## Examples

```
data(exGRM)
cusum.poly(dat = exGRM, NCat = 6)
```

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| ex2PL | *Example data set based on a simulated 2PL model.* |
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## Description

Example data set based on a simulated 2PL model.

## Usage

```
data(ex2PL)
```

## Format

A data frame with 200 rows and 10 variables.

## Source

Simulated data.

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| exGRM | *Example data set based on a simulated GRM model.* |
|-------|------------------------------------------------------|

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## Description

Example data set based on a simulated GRM model.

## Usage

```
data(exGRM)
```

## Format

A data frame with 200 rows and 10 variables.

**Source**

Simulated data.

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gh *Example data set based on a simulated GRM model.*

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**Description**

Example data set based on a simulated GRM model.

**Usage**

gh

**Format**

Gaussian-Hermite Quadature points

**Source**

ltm

# Index