Package ‘PCMRS’

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Title Model Response Styles in Partial Credit Models
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Author Gunther Schauberger
Maintainer Gunther Schauberger <gunther.schauberger@tum.de>
Description Implementation of PCMRS (Partial Credit Model with Response Styles) as proposed in by Tutz, Schauberger and Berger (2018) <doi:10.1177/0146621617748322>. PCMRS is an extension of the regular partial credit model. PCMRS allows for an additional person parameter that characterizes the response style of the person. By taking the response style into account, the estimates of the item parameters are less biased than in partial credit models.
License GPL (>= 2)
Imports Rcpp (>= 0.12.4)
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Description

Performs PCMRS, a method to model response styles in Partial Credit Models

Author(s)

Gunther Schauberger
<gunther.schauberger@tum.de>
https://www.sg.tum.de/epidemiologie/team/schauberger/

References


See Also

PCMRS, person.posterior, tenseness, emotion

Examples

```r
## Not run:
##########################################################################
## Small example to illustrate model and person estimation
##########################################################################

data(tenseness)
set.seed(5)
samples <- sample(1:nrow(tenseness), 100)
tense_small <- tenseness[samples,1:4]

m_small <- PCMRS(tense_small, cores = 2)
m_small
plot(m_small)

persons <- person.posterior(m_small, cores = 2)
plot(jitter(persons, 100))

##########################################################################
## Example from Tutz et al. 2017:
##########################################################################

data(emotion)
```
### Description

Data from the Freiburg Complaint Checklist. The data contain all 8 items corresponding to the scale *Emotional reactivity* for 2032 participants of the standardization sample of the Freiburg Complaint Checklist.

### Format

A data frame containing data from the Freiburg Complaint Checklist with 2032 observations. All items refer to the scale *Emotional reactivity* and are measured on a 5-point Likert scale where low numbers correspond to low frequencies or low intensities of the respective complaint and vice versa.

- **Feel upset in whole body** Do you feel it in the whole body when you get upset about something?
- **Eyes well up with tears** Do your eyes well up with tears in certain situations?
- **Stammer** Do you sometimes start stammering in certain situations?
- **Blush** Do you blush?
- **Gasp for air** Do you have to gasp for air in exciting situations, so that you have to take a deep breath?
- **Rapid heartbeat in excitement** Do you feel a rapid heartbeat in excitement?
- **Urge to defecate in excitement** Do you feel the urge to defecate in excitement?
- **Trembling knees** Do you start trembling in excitement or do you get trembling knees?

### Source


### References

Examples

```r
## Not run:
data(emotion)
m.emotion <- PCMRS(emotion)
m.emotion

plot(m.emotion)

## End(Not run)
```

---

PCMRS  

Model Response Styles in Partial Credit Models

Description

Performs PCMRS, a method to model response styles in Partial Credit Models

Usage

```r
PCMRS(
  Y,
  Q = 10,
  scaled = TRUE,
  method = c("L-BFGS-B", "nlminb"),
  cores = 30,
  lambda = 0
)
```

Arguments

- **Y**: Data frame containing the ordinal item response data (as ordered factors), one row per observation, one column per item.
- **Q**: Number of nodes to be used (per dimension) in two-dimensional Gauss-Hermite-Quadrature.
- **scaled**: Should the scaled version of the response style parameterization be used? Default is `TRUE`.
- **method**: Specifies optimization algorithm used by `optim`, either `L-BFGS-B` or `nlminb`.
- **cores**: Number of cores to be used in parallelized computation.
- **lambda**: Tuning parameter for optional L2 penalty on coefficient vector (for stabilized estimation)
Value

- **delta**: Matrix containing all item parameters for the PCMRS model, one row per item, one column per category.
- **Sigma**: 2x2 covariance matrix for both random effects, namely the ability parameters theta and the response style parameters gamma.
- **delta.PCM**: Matrix containing all item parameters for the simple PCM model, one row per item, one column per category.
- **sigma.PCM**: Estimate for variance of ability parameters theta in the simple PCM model.
- **Y**: Data frame containing the ordinal item response data, one row per observation, one column per item.
- **scaled**: Logical, TRUE if scaled version of the response style parameterization is used.
- **neg.loglik**: Negative marginal log-likelihood

Author(s)

Gunther Schauberger
<gunther.schauberger@tum.de>
https://www.sg.tum.de/epidemiologie/team/schauberger/

References


See Also

person.posterior PCMRS-package

Examples

```r
## Not run:
#############################################################
## Small example to illustrate model and person estimation
#############################################################

data(tenseness)
set.seed(5)
samples <- sample(1:nrow(tenseness), 100)
tense_small <- tenseness[samples,1:4]
m_small <- PCMRS(tense_small, cores = 2)
m_small
plot(m_small)

persons <- person.posterior(m_small, cores = 2)
```
### person.posterior

**Description**

Calculates posterior estimates for both person parameters, namely the ability parameters theta and the response style parameters gamma.

**Usage**

```r
person.posterior(model, cores = 30, tol = 1e-04, maxEval = 600, which = NULL)
```

**Arguments**

- **model**: Object of class PCMRS.
- **cores**: Number of cores to be used in parallelized computation.
- **tol**: The maximum tolerance for numerical integration, default 1e-4. For more details see `adaptIntegrate`.
- **maxEval**: The maximum number of function evaluations needed in numerical integration. If specified as 0 implies no limit. For more details see `adaptIntegrate`.
- **which**: Optional vector to specify that only for a subset of all persons the posterior estimate is calculated.

**Value**

Matrix containing all estimates of person parameters, both theta and gamma.

**Author(s)**

Gunther Schauberger  
<gunther.schauberger@tum.de>  
[https://www.sg.tum.de/epidemiologie/team/schauberger/](https://www.sg.tum.de/epidemiologie/team/schauberger/)
References


See Also

PCMRS PCMRS-package

Examples

```r
## Not run:

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Format

A data frame containing data from the Freiburg Complaint Checklist with 2042 observations. All items refer to the scale Tenseness and are measured on a 5-point Likert scale where low numbers correspond to low frequencies or low intensities of the respective complaint and vice versa.

Clammy hands  Do you have clammy hands?
Sweat attacks  Do you have sudden attacks of sweating?
Clumsiness  Do you notice that you behave clumsy?
Wavering hands  Are your hands wavering frequently, e.g. when lightning a cigarette or when holding a cup?
Restless hands  Do you notice that your hands are restless?
Restless feet  Do you notice that your feet are restless?
Twitching eyes  Do you notice unvoluntary twitching of your eyes?
Twitching mouth  Do you notice unvoluntary twitching of your mouth?

Source


References


Examples

```r
## Not run:
data(tenseness)
set.seed(1860)
samples <- sample(1:nrow(tenseness), 300)
tense_small <- tenseness[samples,]
m_small <- PCMRS(tense_small, cores = 25)
m_small
plot(m_small)

persons <- person.posterior(m_small, cores = 25)
plot(jitter(persons,100))

## End(Not run)
```
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