Package ‘irtrees’

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Title Estimation of Tree-Based Item Response Models
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**dendrify**

**Description**

Helper functions and example data sets to facilitate the estimation of tree-based item Response models of the GLMM family with function glmer from the lme4 package

**Author(s)**

Ivailo Partchev <partchev@gmail.com>

**References**


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**dendrify**

**Measurement Mapping for an IRTree Model**

**Description**

Expands a wide-form matrix of item responses to a long-form data frame of sub-item responses

**Usage**

dendrify(mat, cmx)

**Arguments**

- `mat` An integer matrix of IRT responses (columns represent items, rows represent respondents)
- `cmx` A mapping matrix with as many rows as there are response options for the items.

**Value**

A data frame with one row per sub-item response

**Author(s)**

Ivailo Partchev
References


See Also

exogenize

Examples

mapping <- cbind(c(0,1,1), c(NA,0,1))
str(linrespT <- dendrify(linresp, mapping))

exogenize Structural Mapping for an IRTree Model

Description

Expands a wide-form file of item responses to a long-form file supporting structural mappings among latent variables

Usage

exogenize(mat, cmx, items=seq_len(ncol(mat)), endnode, crossitem=NULL)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mat</td>
<td>An integer matrix of IRT responses (columns represent items, rows represent respondents)</td>
</tr>
<tr>
<td>cmx</td>
<td>The mapping matrix.</td>
</tr>
<tr>
<td>items</td>
<td>A numeric vector with the column positions of all items (measurement variables) in mat. Defaults to all columns of mat.</td>
</tr>
<tr>
<td>endnode</td>
<td>A factor with the same length as items indicating the latent variable to which the item is attached, and compatible with the mapping matrix.</td>
</tr>
<tr>
<td>crossitem</td>
<td>A factor with the same length as items indicating the original items that have been crossed with endnode (e.g., given at various occasions over time), thus producing the actual items. This is not meaningful when the design is nested, and should better be omitted in such cases.</td>
</tr>
</tbody>
</table>
Value

A data frame with columns:

- **person**: a factor identifying the respondent;
- **item**: a factor identifying the items;
- **exol to exos**: dummy variables identifying the internal nodes: these play the same role as `exofactor` but are necessary when the model must include independent random effects;
- **endnode**: a factor identifying the end nodes and thus the endogeneous latent variables;
- **crossitem**: a factor produced only for crossed designs, identifying the items that are crossed with `endnode`, for example, in the case when the same items are repeated over time in a longitudinal design;
- **value**: the binary item responses.

Author(s)

Ivailo Partchev

References


See Also

dendrify

Examples

```r
str(linlatT <- exogenize(linlat,
cbind(c(1,0,0), c(1,1,0), c(0,1,0), c(0,1,1), c(0,0,1)),
   endnode = rep(1:3, each=10), cross = rep(1:10, 3))
```

---

linlat  

**Example Data: Sequential-Order Latent Variable Models**

Description

Simulated example data set for a model with sequential-order latent variable models.

Format

An IRT response matrix with 300 persons and 30 binary items.
linresp

References

Examples
```r
str(linlat)
str(linlatt <- exogenize(linlat, cbind(c(1,0,0), c(1,1,0), c(0,1,0), c(0,1,1), c(0,0,1)),
    endnode = rep(1:3, each=10), cross = rep(1:10, 3)))
```

<table>
<thead>
<tr>
<th>linresp</th>
<th>Example Data: Linear Hierarchical Categories</th>
</tr>
</thead>
</table>

Description
Simulated example data set with linear hierarchical categories.

Format
An IRT response matrix with 300 persons and 10 three-category items.

References

Examples
```r
str(linresp)
mapping <- cbind(c(0,1,1), c(NA,0,1))
str(linrespT <- dendrify(linresp, mapping))
```

<table>
<thead>
<tr>
<th>neslat</th>
<th>Example Data: Nested Hierarchical Categories</th>
</tr>
</thead>
</table>

Description
Simulated example data set for a model with nested hierarchical latent variables.

Format
An IRT response matrix with 300 persons and 30 binary items.
References


Examples

```r
str(neslat)
str(neslatT <-
  exogenize(neslat, cbind(c(1,1,1), c(1,0,0), c(0,1,0), c(0,0,1)),
  endnode=rep(1:3, each = 10)))
```

---

### Example Data: Nested Hierarchical Latent Variables

**Description**

Simulated example data set with nested hierarchical categories.

**Usage**

```r
data(nesresp)
```

**Format**

An IRT response matrix with 300 persons and 10 four-category items.

**References**


**Examples**

```r
str(nesresp)
head(nesresp)
str(nesrespT <-
  dendrify(nesresp, cbind(c(0,0,1,1), c(0,1,NA,NA), c(NA,NA,0,1))))
head(nesrespT, 20)
```
VerbAgg2

**Description**

Item responses to a questionnaire on verbal aggression. These data are used throughout De Boeck and Wilson, Explanatory Item Response Models (Springer, 2004) to illustrate various forms of item response models.

**Format**

A data matrix with 316 persons, 24 three-category items, and two person covariates (trait anger and gender).

**Source**

http://bear.soe.berkeley.edu/EIRM/

**References**


**Examples**

```R
str(VerbAgg2)
mapping <- cbind(c(1,1,1), diag(3))
str(VerbAgg2T <- exogenize(VerbAgg2[,c(1,2)], mapping, endnode=rep(1:3, 8)))
```

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VerbAgg3

**Description**

Item responses to a questionnaire on verbal aggression. These data are used throughout De Boeck and Wilson, Explanatory Item Response Models (Springer, 2004) to illustrate various forms of item response models.

**Format**

A data matrix with 316 persons, 24 three-category items, and two person covariates (trait anger and gender).

**Source**

http://bear.soe.berkeley.edu/EIRM/
References


Examples

str(VerbAgg3)
mapping <- cbind(c(0,1,1), c(NA,0,1))
str(VerbAgg3T <- dendrify(VerbAgg3[,c(1,2)], mapping))
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