Package ‘metatest’

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Type Package
Title Fit and Test Metaregression Models
Version 1.0-5
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Description Fits and tests meta regression models and generates a number of useful test statistics: next to t- and z-tests, the likelihood ratio, bartlett corrected likelihood ratio and permutation tests are performed on the model coefficients.
Depends R (>= 3.5.0)
License GPL
LazyLoad yes
NeedsCompilation no
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R topics documented:

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Description

metatest fits and tests a metaregression model. In addition to the traditional z test on the estimated coefficients, metatest also yields more reliable statistics: the t-test, log likelihood ratio test, Bartlett corrected log likelihood ratio test, and the permutation test. The Bartlett corrected log likelihood ratio test and the permutation test are to be recommended since their type 1 errors are adequate. See metatest for details and an example.

Details

Package: metatest
Type: Package
Version: 1.0-2
Date: 2011-10-04
License: GPL
LazyLoad: yes

Author(s)

The code that does the hard work was written by Hilde Huizenga. Ingmar Visser added the interface functions and handled turning code into a package. Maintainer: Ingmar Visser <i.visser@uva.nl>

References


metadata

Example data for meta regression testing.

Description

Small example data set used in the example on the metatest help page.

Usage

data(metadata)
**Format**

A data frame with 6 observations on the following 3 variables.

- **y** The effect sizes.
- **yvar** The variances of the effect sizes.
- **x** A moderator variable.

**Source**

Data were randomly generated following an example in Huizenga et al (2011) below.

**References**


**Examples**

```r
data(metadata)
metadata
```

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**Description**

`metatest` fits and tests a metaregression model. In addition to the traditional z test on the estimated coefficients, `metatest` also yields more reliable statistics: the t-test, log likelihood ratio test, Bartlett corrected log likelihood ratio test, and the permutation test. The Bartlett corrected log likelihood ratio test and the permutation test are to be recommended since their type 1 errors are adequate.

**Usage**

```r
metatest(formula, variance, data, threshold = 1e-05, maxiter = 100, nperm = 1000, ...)
```

```r
## S3 method for class 'metatest'
summary(object, digits = 4, ...)
## S3 method for class 'metatest'
print(x, ...)
```
Arguments

- **formula**: A formula specifying the meta regression model; use `y~x` to specify a meta regression of effect sizes `y` moderated by `x`; the moderators can be either continuous or categorical variables; an intercept is included by default (use `y~x-1` to drop the intercept); use `y~1` for an intercept only model, i.e., a meta-analysis model.

- **variance**: The variances of the effect sizes to be modelled (a vector or a variable name interpreted in `data`).

- **data**: A `data.frame` to interpret the variables in arguments `formula` and `variance`.

- **threshold**: The threshold used in estimating the model; the threshold is the change in the value of the random effects variance parameter.

- **maxiter**: Maximum number of iterations allowed in estimating the model.

- **npermut**: Number of permutations performed by the permutation test.

- **object, x**: Object of class `metatest`.

- **digits**: Determines the number of digits to use in printing the results.

- **...**: Not currently used.

Details

The effect sizes to be analyzed can be of arbitrary type; some transformations between different effect size measures are provided. For many more see the package `compute.es`.

The print and summary methods are currently identical (this may change in the future), and print the random effects variance, the coefficients, and all the computed statistics and associated p-values.

Value

`metatest` returns an object of class `metatest` which is a named list with the following elements:

- **convergence**: Convergence info; 0 indicates convergence; -1 signals that the estimator of between study variance was set to zero during estimation (with a warning).

- **iter**: Number of iterations used in optimizing the parameters.

- **variance**: Matrix with between study variance estimate, its associated log likelihood ratio statistic, df and p-value.

- **coefficients**: Estimated coefficients.

- **se**: Standard errors of the coefficients.

- **tval**: The t-ratios of the coefficients.

- **pZtest**: The p-values associated with the z-test.

- **dfttest**: The df’s associated with the t-tests.

- **pttest**: The p-values associated with the t-test.

- **LLR**: The log likelihood ratio statistics.

- **pLLR**: The p-values associated with the LLR statistics.

- **bartLLR**: The Bartlett corrected LLR statistics.

- **buckscale**: The Bartlett scaling factor used to compute the corrected LLR statistics.

- **pBartlett**: The p-values associated with the Bartlett corrected LLR statistics.

- **ppermtest**: The p-values of the permutation tests.

- **call**: The function call that created the `metatest` object.
transformations

Author(s)
Ingmar Visser & Hilde Huizenga. Maintainer: Ingmar Visser <i.visser@uva.nl>

References

Examples
```r
data(metadata)
res <- metatest(y~x,yvar, data=metadata)
res
```

transformations

Transform effect sizes.

Description
Utility functions to transform various effect size measures into each other.

Usage
```r
r2z(r)  
r2d(r)  
z2r(z)  
z2d(z)
```

Arguments
- `r`: A correlation coefficient.
- `z`: A z-value, i.e., a normalized effect size.

Details
Transform effect sizes into correlations, (Cohen's) d effect sizes, or z-distributed for performing meta-regression.

Value
Return values are z, d or r values.

Author(s)
Ingmar Visser.
Examples

```r
## The function r2z is currently defined as
function(r) {
  return(0.5*(log(1+r)-log(1-r)))
}
```
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