Package 'metatest'

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Type Package

Title Fit and Test Metaregression Models

Version 1.0-5

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Author Hilde M. Huizenga & Ingmar Visser

Maintainer Ingmar Visser <i.visser@uva.nl>

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

Repository CRAN

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R topics documented:

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metatest-package   *metatest fits and tests a metaregression model*

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

Hilde M. Huizenga, Ingmar Visser & Conor V. Dolan (2011). Hypothesis testing in random effects meta-regression, *British Journal of Mathematical and Statistical Psychology*, 64, 1-19.

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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

Hilde M. Huizenga, Ingmar Visser & Conor V. Dolan (2011). Hypothesis testing in random effects meta-regression, *British Journal of Mathematical and Statistical Psychology*, 64, 1-19.

Examples

```
data(metadata)
metadata
```

---

metatest   *metatest fits and tests a metaregression model*

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

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

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

Arguments

formula	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 interpet 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.
bartscale	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.

Author(s)

Ingmar Visser & Hilde Huizenga. Maintainer: Ingmar Visser <i.visser@uva.nl>

References

Hilde M. Huizenga, Ingmar Visser & Conor V. Dolan (2011). Hypothesis testing in random effects meta-regression, *British Journal of Mathematical and Statistical Psychology*, 64, 1-19.

Examples

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

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transformations   *Transform effect sizes.*

Description

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

Usage

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

Arguments

r   A correlation coefficient.

z   A z-value, ie 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.

References

Tba

Examples

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

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