Package ‘robustmeta’

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Type     Package
Title    Robust Inference for Meta-Analysis with Influential Outlying Studies
Version  1.2-1
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Description
Robust inference methods for fixed-effect and random-effects models of meta-analysis are implementable. The robust methods are developed using the density power divergence that is a robust estimating criterion developed in machine learning theory, and can effectively circumvent biases and misleading results caused by influential outliers. The density power divergence is originally introduced by Basu et al. (1998) <doi:10.1093/biomet/85.3.549>, and the meta-analysis methods are developed by Noma et al. (2022) <forthcoming>.

Depends  R (>= 3.5.0)
Imports  stats, metafor
License  GPL-3
Encoding UTF-8
LazyData true
NeedsCompilation no
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**robustmeta-package**

*The 'robustmeta' package.*

**Description**

A R package for implementing the robust inference methods for meta-analysis involving influential outlying studies.

**References**


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**clbp**

*Rubinstein et al. (2019)'s chronic low back pain data*

**Description**

- ID: Study ID
- Source: First author name and year of publication
- m1: Estimated mean in experimental group
- s1: Standard deviation in experimental group
- n1: Number of observations in experimental group
- m2: Estimated mean in control group
- s2: Standard deviation in control group
- n2: Number of observations in control group

**Usage**

data(clbp)

**Format**

A data frame with 23 rows and 8 variables

**References**

Description
Implementing the robust inference for meta-analysis involving influential outlying studies based on the density power divergence.

Usage
rmeta(y, v, model="RE", gamma=0.01)

Arguments
y A vector of the outcome measure estimates (e.g., MD, SMD, log OR, log RR, log HR, RD)
v A vector of the variance estimate of y
model Type of the pooling model; "FE": Fixed-effect model or "RE": Random-effects model; Default is "RE"
gamma Unit of grid search to explore the optimal value of tuning parameter alpha on (0,1); Default is 0.01

Value
Results of the robust inference for meta-analysis.
- mu: Estimate of the common effect (for the fixed-effect model) or the grand mean (for the random-effects model).
- se: Standard error estimate of mu.
- CI: 95 percent confidence interval of mu.
- P: P-value of the hypothesis test of mu=0.
- alpha: Selected alpha by the Hyvarinen score.
- W: Contribution rates of individual studies (ui: contribution rates of the conventional methods, wi: contribution rates of the robust methods).

References
**Examples**

```r
require(metafor)
data(clbp)
edat1 <- escalc(measure="SMD",m1i=m1,m2i=m2,sd1i=s1,sd2i=s2,n1i=n1,n2i=n2,data=clbp)
DL1 <- rma(yi, vi, data=edat1, method="DL")
print(DL1) # ordinary DerSimonian-Laird method
plot(DL1) # plots of influential statistics, etc.
```

```r
y <- as.numeric(edat1$yi) # definition of summary statistics
v <- edat1$vi
rmeta(y,v) # robust inference based on the random-effects model
rmeta(y,v,model="FE") # robust inference based on the fixed-effect model
```

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**varenicline**

*Thomas et al. (2015)*'s varenicline data

**Description**

- **study**: Study ID
- **d1**: Number of depression events in treatment group
- **n1**: Number of observations in treatment group
- **d0**: Number of depression events in control group
- **n0**: Number of observations in control group

**Usage**

```r
data(varenicline)
```

**Format**

A data frame with 29 rows and 5 variables

**References**

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