

Package ‘metapro’

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Type Package

Title Robust P-Value Combination Methods

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Description The meta-analysis is performed to increase the statistical power by integrating the results from several experiments. The p-values are often combined in meta-analysis when the effect sizes are not available. The 'metapro' R package provides not only traditional methods (Becker BJ (1994, ISBN:0-87154-226-9), Mosteller, F. & Bush, R.R. (1954, ISBN:0201048523) and Lancaster HO (1949, ISSN:00063444)), but also new methods such as weighted Fisher's method and ordmeta we developed. While the (weighted) Z-method is suitable for finding features effective in most experiments, (weighted) Fisher's method and ordmeta are useful for detecting partially associated features. Thus, the users can choose the function based on their purpose.

License GPL (>= 2)

Encoding UTF-8

LazyData true

Imports metap, stats, rSymPy

RoxygenNote 6.1.1

URL <https://github.com/unistbig/metapro>

NeedsCompilation no

Repository CRAN

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lancaster	<i>Lancaster</i>
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Description

P-value combination based on Lancaster's procedure

Usage

```
lancaster(p, weight, is.onetail = TRUE, eff.sign)
```

Arguments

p	A numeric vector of p-values
weight	A numeric vector of weights (e.g., samples sizes)
is.onetail	Logical. If set TRUE, p-values are combined without considering the direction of effect, and vice versa. Default: TRUE.
eff.sign	A vector of signs of effect sizes (1 or -1). It works when is.onetail = FALSE

Value

A list of combined p-value (p) is returned if is.onetail=TRUE. Otherwise, the direction of combined effects (overall.eff.direction) is added.

References

Becker BJ (1994). "Combining significance levels." In Cooper H, Hedges LV (eds.), A handbook of research synthesis, 215-230. Russell Sage, New York.

Lancaster HO (1949). "Combination of probabilities arising from data in discrete distributions." Biometrika, 36, 370-382.

Examples

```
lancaster(p=c(0.01,0.2,0.8), weight=c(20,50,10), is.onetail=FALSE, eff.sign=c(1,1,1))
```

ordmeta	<i>ordmeta</i>
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Description

Minimum Marginal P-value in joint order distribution

Usage

```
ordmeta(p, is.onetail = TRUE, eff.sign = NULL)
```

Arguments

p	A vector of p-values
is.onetail	Logical. If set TRUE, p-values are combined without considering the direction of effect, and vice versa. Default: TRUE.
eff.sign	A vector of signs of effect sizes. It works when is.onetail = FALSE

Value

A list of combined p-value (p), optimal rank where minimum marginal p-value exists (optimal_rank), index of effective p-values (eff.p.idx) and minimum marginal p-value (MMP) if is.onetail=TRUE. Otherwise, the direction of combined effects (overall.eff.direction) is added.

Examples

```
ordmeta(p=c(0.01, 0.02, 0.8, 0.25), is.onetail=FALSE, eff.sign = c(1,1,1,-1))
```

wFisher	<i>wFisher</i>
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Description

sample size-weighted Fisher's method

Usage

```
wFisher(p, weight = NULL, is.onetail = TRUE, eff.sign)
```

Arguments

p	A numeric vector of p-values
weight	A numeric vector of weight or sample size for each experiment
is.onetail	Logical. If set TRUE, p-values are combined without considering the direction of effects, and vice versa. Default: TRUE.
eff.sign	A vector of signs of effect sizes. It works when is.onetail = FALSE

Value

A list of combined p-value (p) is returned if `is.onetail=TRUE`. Otherwise, the direction of combined effects (`overall.eff.direction`) is added.

References

Becker BJ (1994). "Combining significance levels." In Cooper H, Hedges LV (eds.), A handbook of research synthesis, 215-230. Russell Sage, New York.

Fisher RA (1925). Statistical methods for research workers. Oliver and Boyd, Edinburgh.

Examples

```
wFisher(p=c(0.01,0.2,0.8), weight = c(50,60,100),is.onetail=FALSE, eff.sign=c(1,1,1))
```

wZ

wZ

Description

P-value combination based on weighted Z-method

Usage

```
wZ(p, weight = NULL, is.onetail = TRUE, eff.sign)
```

Arguments

<code>p</code>	A numeric vector of p-values
<code>weight</code>	A numeric vector of weights (e.g., sample sizes)
<code>is.onetail</code>	Logical. If set TRUE, p-values are combined without considering the direction of effect, and vice versa. Default: TRUE.
<code>eff.sign</code>	A vector of signs of effect sizes. It works when <code>is.onetail = FALSE</code>

Value

A list of combined p-value (p) and transformed sum of z-values (`sumz`) is returned if `is.onetail=TRUE`. Otherwise, the direction of combined effects (`overall.eff.direction`) is added.

References

Becker BJ (1994). "Combining significance levels." In Cooper H, Hedges LV (eds.), A handbook of research synthesis, 215-230. Russell Sage, New York.

Stouffer SA, Suchman EA, DeVinney LC, Star SA, Williams RMJ (1949). The American soldier, vol 1: Adjustment during army life. Princeton University Press, Princeton.

Mosteller, F. & Bush, R.R. (1954). Selected quantitative techniques. In: Handbook of Social Psychology, Vol. 1 (G. Lindzey, ed.), pp. 289-334. Addison - Wesley Cambridge, Mass.

Examples

```
wZ(p=c(0.01,0.2,0.8), weight = c(20,10,40), is.onetail=FALSE, eff.sign=c(1,-1,1))
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