

Package ‘metapro’

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Type Package

Title Robust P-Value Combination Methods

Version 1.5.11

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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 method named weighted Fisher's method we developed. While the (weighted) Z-method is suitable for finding features effective in most experiments, (weighted) Fisher's method is useful for detecting partially associated features. Thus, the users can choose the function based on their purpose. Yoon et al. (2021) ``Powerful p-value combination methods to detect incomplete association" <doi:10.1038/s41598-021-86465-y>.

License GPL (>= 2)

Encoding UTF-8

Imports metap, stats

RoxygenNote 7.2.3

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

Repository CRAN

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F_i	Beta probability
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Description

Beta probability

Usage

F_i(p, i, n)

Arguments

p	p-value
i	rank
n	The number of inputs

lancaster	Lancaster
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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

- p : Combined p-value
- overall.eff.direction : The direction of combined effects.

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))
```

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

<code>p</code>	A numeric vector of p-values
<code>weight</code>	A numeric vector of weight or sample size for each experiment
<code>is.onetail</code>	Logical. If set TRUE, p-values are combined without considering the direction of effects, 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

`p` : Combined p-value
`overall.eff.direction` : The direction of combined effects.

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
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Description

P-value combination based on weighted Z-method

Usage

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

Arguments

p	A numeric vector of p-values
weight	A numeric vector of weights (e.g., sample 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. It works when is.onetail = FALSE

Value

p : Combined p-value
 overall.eff.direction : The direction of combined effects.
 sumz : Sum of transformed z-score

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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