

Package ‘power.he’

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Type Package

Title The R power.he package

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Description Calculate sample size or power for hierarchical endpoints.

The package can handle any type of outcomes (binary, continuous, count, ordinal, time-to-event), and allows users to find power calculations for win ratios, win odds, net benefits, and DOORs. Given a desired power, the package can calculate the sample size needed.

License What license is it under?

Encoding UTF-8

LazyData true

RoxygenNote 7.3.2

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format	<i>Format HIE Results</i>
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Description

This formats the results outputted from the hie function

Usage

```
format(result)
```

Arguments

result A list

Examples

```
# one TTE endpoint
endpoints_input <- list(
  list(type = "TTE", hr = 0.8, er.b = 0.25, s = 12, tte.winning.direction = "GT")
)
results <- hie(endpoints_input, sample.size = 100, alpha = 0.05, rratio = 0.5, output = "ALL")
format(results)
```

hie

Hierarchical Endpoints

Description

This creates the probability: win, lose, tie, WR, NB, WO, DOOR and creates sample size or power using results.

Usage

```
hie(
  endpoints_input,
  sample.size = NA,
  power = NA,
  alpha = 0.05,
  rratio = 0.5,
  output = "ALL"
)
```

Arguments

endpoints_input

A list with each endpoint being a nested list

- Time to Event "TTE":
 - tte.winning.direction: winning direction ("GT" or "LT")
 - er.a OR hr: probability of event in group A OR hazard ratio (group A relative to group B)
 - er.b: probability of event in group B
 - s: follow-up time
- Continuous "Continuous":
 - continuous.winning.direction: winning direction ("GT" or "LT")
 - mu.a OR mean.diff: mean in group A OR mean difference of group A minus group B
 - mu.b: mean in group B
 - sd.a: standard deviation in group A
 - sd.b: standard deviation in group B
 - delta: threshold to win
- Binary (1/0) "Binary":
 - binary.winning.direction: winning direction ("GT" or "LT")
 - pi.a OR prob.diff: Prob(Y=1) in group A OR Prob(Y=1) of group A minus group B

- pi.b: Prob($Y=1$) in group B
- Count Endpoint (such as # of events) "Count":
 - count.winning.direction: winning direction ("GT" or "LT")
 - lam.a OR rr: number of counts/events in group A OR relative rate of group A over group B
 - lam.b: number of counts/events in group B
- Ordinal (1, 2, ..., J) "Ordinal":
 - ordinal.winning.direction: winning direction ("GT" or "LT")
 - pi.ordinal.a: Prob($Y=1$), ..., Prob($Y=J$) in group A (comma-separated)
 - pi.ordinal.b: Prob($Y=1$), ..., Prob($Y=J$) in group B (comma-separated)

sample.size An integer (enter either sample.size or power)

power 0 to 1 (enter either sample.size or power)

alpha Two-sided Type 1 Error

rratio Randomization probability for Group A

output Choose from: ALL, WR, WO, NB, DOOR

Examples

```
# Two continuous hierarchical endpoints:
The marginal distributions for  $\{Y_{1A}\}$ ,  $\{Y_{1B}\}$  are  $N(15, 60^2)$  and  $N(4, 60^2)$ , re
For  $\{Y_{2A}\}$ ,  $\{Y_{2B}\}$ , the marginal distributions are  $N(40, 24^2)$  and  $N(30, 24^2)$ .
For both endpoints, the threshold to win is chosen to be the same as  $\{\delta_1 = \delta_2 = 5\}$ .
endpoints_input <- list(
  list(type = "Continuous", mu.a = 15, mu.b = 4, sd.a = 60, sd.b = 60, delta = 5, continuous.winning.direction = "
  list(type = "Continuous", mu.a = 40, mu.b = 30, sd.a = 24, sd.b = 24, delta = 5, continuous.winning.direction = "
)
hie(endpoints_input, power = 0.85, alpha = 0.05, rratio = 0.5, output = "ALL")
```

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