Package 'TrendInTrend'

August 22, 2017

Type Package

Title Odds Ratio Estimation and Power Calculation for the Trend in Trend Model

Version 1.0.2

Date 2017-08-21

Author Xinyao Ji and Ashkan Ertefaie

Maintainer Ashkan Ertefaie <ashkan_ertefaie@urmc.rochester.edu>

Description Estimation of causal odds ratio and power calculation given trends in exposure prevalence and outcome frequencies of stratified data.

Depends R (>= 3.2.2), stats

Imports pROC, rms

License GPL (>= 2)

RoxygenNote 6.0.1

NeedsCompilation no

Repository CRAN

Date/Publication 2017-08-22 07:09:46 UTC

R topics documented:

GenData *Generate simulation data*

Description

Generate simulation data

Usage

```
GenData()
```

OR *An Odds Ratio Estimation Function*

Description

estimate causal odds ratio given trends in exposure prevalence and outcome frequencies of stratified data.

Usage

```
OR(n11, n10, n01, n00)
```

Arguments

n11	A G by T matrix with n11[i,j] being the counts of positive outcomes among treated subjests within group i at time j;
n10	A G by T matrix with n10[i,j] being the counts of negative outcomes among treated subjests within group i at time j;
n01	A G by T matrix with n01[i,j] being the counts of positive outcomes among control subjests within group i at time j;
n00	A G by T matrix with n00[i,j] being the counts of negative outcomes among control subjests within group i at time j.

Value

ORs ratio and 95% conference interval

References

Ji, X., Small, D. S., Leonard, C. E., & Hennessy, S. (2017). The trend-in-trend research design for causal inference. Epidemiology (Cambridge, Mass.), 28(4), 529.

Examples

```
data <- GenData()
n11 <- data[[1]]
n10 <- data[[2]]
n01 <- data[[3]]
n00 <- data[[4]]
results <- OR(n11,n10,n01,n00)
```

`ttdetect` *Finding a detectable odds Ratio with a given power*

Description

Monte Carlo power calculation for a trend-in-trend design

Usage

```
ttdetect(N,time,G,cstat,alpha_t,beta_0,power,nrep, OR.vec)
```

Arguments

`N`	Sample size.
`time`	Number of time points.
`G`	Number of CPE strata
`cstat`	Value of the c-statistic.
`alpha_t`	A scaler that qunatifies the trend in exposure prevalence.
`beta_0`	Intercept of the outcome model.
`power`	A given power.
`nrep`	Number of Monte Carlo replicates.
`OR.vec`	A vector of odds Ratios

Value

An object 'ttdetect' is a list of containing the following components:

`Power`	A vector of calculated powers for a given OR.vec
`OR.vec`	A vector of odds Ratios
`DetectDifference`	A detectable difference for a given power value

Examples

```
## Not run:
ttdetect(N=10000,time=10,G=10,cstat=0.75,alpha_t= 0.4,beta_0=-4.3,
power=0.80,nrep=50, OR.vec=c(1.9,2.0,2.1,2.2))

## End(Not run)
```

`ttpower` *Power calculation in trend-in-trend design*

Description

Monte Carlo power calculation for a trend-in-trend design

Usage

```
ttpower(N,time,G,cstat,alpha_t,beta_0,h1.OR,nrep)
```

Arguments

`N`	Sample size.
`time`	Number of time points.
`G`	Number of CPE strata
`cstat`	Value of the c-statistic.
`alpha_t`	A scaler that qunatifies the trend in exposure prevalence.
`beta_0`	Intercept of the outcome model.
`h1.OR`	A given odds ratio.
`nrep`	Number of Monte Carlo replicates.

Value

Power of detecting the given Odds Ratio

Examples

```
## Not run:
ttpower(N=10000,time=10,G=10,cstat=0.75,alpha_t= 0.4,beta_0=-4.3,h1.OR=1.5,nrep=50)

## End(Not run)
```

Index