

Package ‘BayesNI’

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Type Package

Title BayesNI: Bayesian Testing Procedure for Noninferiority with Binary Endpoints

Version 0.1

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Description A Bayesian testing procedure for noninferiority trials with binary endpoints. The prior is constructed based on Bernstein polynomials with options for both informative and non-informative prior. The critical value of the test statistic (Bayes factor) is determined by minimizing total weighted error (TWE) criteria

License GPL-2

LazyLoad yes

Repository CRAN

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BayesNI-package

Semiparametric Bayesian Noninferiority Testing

Description

This package implements a Bayesian testing procedure for noninferiority trials with binary endpoints. The prior is constructed based on Bernstein polynomials with options for both informative and non-informative prior. The critical value of the test statistic Bayes factor is determined by minimizing total weighted error criteria.

Details

Package:	BayesNI
Type:	Package
Version:	1.0
Date:	2011-11-08
License:	GPL-2
LazyLoad:	yes

Author(s)

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References

Osman M. and Ghosh S. K. (2011) Semiparametric Bayesian Testing Procedure for Non-inferiority Trials with Binary Endpoints. *Journal of Biopharmaceutical Statistics*, 21, 920-937.

See Also

NA

Examples

```
bayesNI(x1=97,x2=98,n1=107,n2=106, dm='OR',rho=0.5, m=20,zeta=0.025, TWE=1)
```

bayesNI	<i>Semiparametric Bayesian testing procedure for non-inferiority trials with binary endpoints</i>
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Description

This function calculates the Bayes factor and the cut-off value for noninferiority trials with binary endpoints. The prior is constructed based on Bernstein polynomials with options for both informative and non-informative prior. The critical value of the test statistic (Bayes factor) is determined by minimizing total weighted error (TWE) criteria.

Usage

```
bayesNI(x1, x2, n1, n2, dm = 'OR', rho, m = 10, noninform.prior = TRUE,
        w1, w2, TWE = 1, zeta = 0.5, plot.prior = FALSE)
```

Arguments

x1	The number of success events in the group 1
x2	The number of success events in the group 2
n1	The total number of subjects in the group 1
n2	The total number of subjects in the group 2
dm	The dissimilarity measure of two binomial parameters: "RD" risk difference ; "RR" relative risk ; "OR" odds ratio (default value)
rho	Noninferiority boundary
m	The order of Bernstein polynomials (default value m=10)
noninform.prior	"TRUE" (default) for using noninformative prior to determines weights in the mixture prior; "FALSE" user-specified weights in the mixture prior based on prior information
w1	If noninform.prior=FALSE, a user-specified vector of weights for the prior of theta_1. The length of this vector should be m.
w2	If noninform.prior=FALSE, a user-specified vector of weights for the prior of theta_2. The length of this vector should be m.
TWE	1 (default value): total weighted error conditioned on the hypotheses; 2 : total weighted error conditioned on the decisions
zeta	The weight the total weighted criteria
plot.prior	future functionality, under development.

Details

This function gives the Bayes factor and the cut-off value for noninferiority trials with binary endpoints. The prior is constructed based on Bernstein polynomials with options for both informative and non-informative prior. The weights w_1 and w_2 are not necessary when using non-informative prior. For informative prior, users can refer to the corresponding section in Osman and Ghosh (2012) on how to construct weights based on historical data. The Bayes factor computed in this function is defined in favor of alternative hypothesis. A larger Bayes factor indicates stronger evidence against the null hypothesis. The critical value of the test statistic (Bayes factor) is determined by minimizing total weighted error (TWE) criteria. Users can refer to Theorem 1 in Osman and Ghosh (2012) for specification of the weight ζ . A common approach is to set $\zeta = \alpha = 0.05$.

Value

logBF	the observed (log) Bayes factor
L_0	the cut-off critical value of (log) Bayes factor for the rejection region
w_1	the weights used in the prior of θ_1
w_2	the weights used in the prior of θ_2

Note

NA

Author(s)

Muhtarjan Osman and Sujit K. Ghosh

References

Osman M. and Ghosh S. K. (2011) Semiparametric Bayesian Testing Procedure for Non-inferiority Trials with Binary Endpoints. *Journal of Biopharmaceutical Statistics*, 21, 920-937.

See Also

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