Package ‘AUtests’

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Title Approximate Unconditional and Permutation Tests
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Description Performs approximate unconditional and permutation testing for
2x2 contingency tables. Motivated by testing for disease association with rare
 genetic variants in case-control studies. When variants are extremely rare,
these tests give better control of Type I error than standard tests.
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R topics documented:

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au.firth  \hspace{1cm} Firth AU testing
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Description

Calculates approximate unconditional Firth test p-value for testing independence in 2x2 case-control
tables. The Firth test requires significantly more computational time than the tests computed in the
au.tests function.

Usage

\texttt{au.firth(m0, m1, r0, r1, lowthresh = 1e-12)}

Arguments

- \texttt{m0} Number of control subjects
- \texttt{m1} Number of case subjects
- \texttt{r0} Number of control subjects exposed
- \texttt{r1} Number of case subjects exposed
- \texttt{lowthresh} A threshold for probabilities below to be considered as zero. Defaults to 1e-12.

Value

A single AU p-value, computed under the Firth test.

Examples

\texttt{au.firth(15000, 5000, 1, 0)}

au.test.strat  \hspace{1cm} Stratified AU testing
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Description

Calculates AU p-values for testing independence in 2x2 case-control tables, while adjusting for cat-
egorical covariates. Inputs are given as a vector of counts in each strata defined by the covariate(s).
Note that computational time can be extremely high.

Usage

\texttt{au.test.strat(m0list, m1list, r0list, r1list, lowthresh = 1e-12)}
au.tests

Arguments

m0list  Number of control subjects in each strata
m1list  Number of case subjects in each strata
r0list  Number of control subjects exposed in each strata
r1list  Number of case subjects exposed in each strata
lowthresh  A threshold for probabilities below to be considered as zero. Defaults to 1e-12.

Value

An AU p-value, computed under the likelihood ratio test.

Examples

au.test.strat(c(500, 1250), c(150, 100), c(0, 0), c(10, 5))

au.tests(15000, 5000, 30, 25)
au.tests(10000, 10000, 30, 25)

au.tests

AU testing

Description

Calculates approximate unconditional p-values for testing independence in 2x2 case-control tables.

Usage

au.tests(m0, m1, r0, r1, lowthresh = 1e-12)

Arguments

m0  Number of control subjects
m1  Number of case subjects
r0  Number of control subjects exposed
r1  Number of case subjects exposed
lowthresh  A threshold for probabilities below to be considered as zero. Defaults to 1e-12.

Value

A vector of AU p-values, computed under score, likelihood ratio, and Wald tests.

Examples

au.tests(15000, 5000, 30, 25)
au.tests(10000, 10000, 30, 25)
basic.tests  Basic testing

Description
Calculates standard p-values for testing independence in 2x2 case-control tables.

Usage
basic.tests(m0, m1, r0, r1)

Arguments
m0  Number of control subjects
m1  Number of case subjects
r0  Number of control subjects exposed
r1  Number of case subjects exposed

Value
A vector of p-values, computed under score, likelihood ratio, Wald, Firth, and Fisher’s exact tests.

Examples
basic.tests(15000, 5000, 30, 25)

perm.test.strat  Stratified permutation testing

Description
Calculates permutation p-values for testing independence in 2x2 case-control tables, while adjusting for categorical covariates. Inputs are given as a vector of counts in each strata defined by the covariate(s). Note that computational time can be extremely high.

Usage
perm.test.strat(m0list, m1list, r0list, r1list)

Arguments
m0list  Number of control subjects in each strata
m1list  Number of case subjects in each strata
r0list  Number of control subjects exposed in each strata
r1list  Number of case subjects exposed in each strata
perm.tests

Value
A permutation p-value, computed under the likelihood ratio test.

Examples
perm.test.strat(c(7000, 1000), c(11000, 1000), c(50, 30), c(70, 40))

perm.tests  Permutation testing

Description
Calculates permutation p-values for testing independence in 2x2 case-control tables.

Usage
perm.tests(m0, m1, r0, r1, lowthresh = 1e-12)

Arguments
m0  Number of control subjects
m1  Number of case subjects
r0  Number of control subjects exposed
r1  Number of case subjects exposed
lowthresh  A threshold for probabilities below to be considered as zero. Defaults to 1e-12.

Value
A vector of permutation p-values, computed under score, likelihood ratio, Wald, and Firth tests.

Examples
perm.tests(15000, 5000, 30, 25)
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