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.

Depends R (>= 3.1.2)

License GPL-2

Imports logistf

LazyLoad yes

Suggests knitr, markdown

VignetteBuilder knitr

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

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Contents

au.firth *Firth AU testing*

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

```
au.firth(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 single AU p-value, computed under the Firth test.

Examples

```
au.firth(15000, 5000, 1, 0)
```

au.test.strat *Stratified AU testing*

Description

Calculates AU 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

```
au.test.strat(m0list, m1list, r0list, r1list, lowthresh = 1e-12)
```

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 *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

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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