

The LDtests Package

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Type Package

Title Exact tests for Linkage Disequilibrium and Hardy-Weinberg Equilibrium

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Description Exact tests for Linkage Disequilibrium (LD) and Hardy-Weinberg Equilibrium (HWE). - 2-sided LD tests based on different measures of LD (Kulinskaya and Lewin 2008) - 1-sided Fisher's exact test for LD - 2-sided Haldane test for HWE (Wiggington 2005) - 1-sided test for inbreeding - conditional p-values proposed in Kulinskaya (2008) to overcome the problems of asymmetric distributions (for both LD and HWE)

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Fisher1sided *1-sided Fisher's test of linkage disequilibrium*

Description

1-sided Fisher's test of linkage disequilibrium

Usage

```
Fisher1sided(ctable, side = "great")
```

Arguments

<code>ctable</code>	Vector of the 4 entries in the 2x2 contingency table
<code>side</code>	"great" or "less" according to which tail you are interested in

Value

<code>pval.Fish</code>	P-value
<code>Prob</code>	Probability of the contingency under the null
<code>yobs</code>	The observed n11 (first cell in the table)
<code>n1</code>	Row margin
<code>n2</code>	Column margin
<code>nn</code>	Sample size

Author(s)

Alex Lewin

References

Kulinskaya and Lewin 2008

Examples

```
ctable <- c(4,5,1,20)
Fisher1sided(ctable)
```

`HWE2sided`*P-values for three different tests of HWE*

Description

Calculates conditional p-values proposed in Kulinskaya (2008) to overcome the problems of asymmetric distributions, the Haldane 2-sided test as implemented by Wiggington et al (2005) and the 1-sided test for inbreeding.

Usage

```
HWE2sided(geno, qqplot = F, title = NULL)
```

Arguments

<code>geno</code>	Vector of genotype counts: no. heterozygotes followed by the nos. homozygotes
<code>qqplot</code>	If <code>qqplot</code> is true the distribution of the null hypothesis is plotted
<code>title</code>	Title for the plot

Value

<code>pval.cond</code>	Conditional p-value
<code>pval.H</code>	2-sided Haldane p-value
<code>pval.inbreed</code>	1-sided test for inbreeding

Author(s)

Alex Lewin

References

Kulinskaya and Lewin 2008

See Also

[HWE2sided.table](#)

Examples

```
geno <- c(20, 73, 7)
HWE2sided(geno)
```

HWE2sided.table *Table and plot of Hardy-Weinberg p-values for all 2x2 tables possible under the null distribution.*

Description

Table and plot of HWE p-values for all possible contingency tables consistent with the margins of the input observed contingency table. See [HWE2sided](#) for details of the p-values calculated.

Usage

```
HWE2sided.table(maf, n, ylim = c(0, 1), xlim = NULL)
```

Arguments

maf	Minor allele frequency
n	Total genotype count
ylim	Y-axis range for plot
xlim	X-axis range for plot

Value

Outputs the table of HWE p-values for all the contingency tables consistent with the margins of the input table.

Author(s)

Alex Lewin

References

Kulinskaya and Lewin 2008

See Also

[HWE2sided](#)

Examples

```
HWE2sided.table(0.17, 100)
geno <- c(20, 73, 7)
HWE2sided(geno)
```

LD2sided.pvals *P-values and Linkage Disequilibrium measures for several tests of Linkage Disequilibrium*

Description

Calculates 2-sided LD tests based on different measures of LD (Kulinskaya and Lewin 2008), 1-sided Fisher's exact test for LD and the conditional p-values proposed in Kulinskaya (2008) to overcome the problems of asymmetric distributions.

Usage

```
LD2sided.pvals(ctable)
```

Arguments

ctable Vector of the 4 entries in the 2x2 contingency table

Value

pval.cond	Conditional p-value
pval.Fish	Fisher's p-value (sum of tables less probable than observed)
pval.LR	P-value based on the likelihood ratio statistic
pval.r	P-value based on the correlation coefficient
pval.Dprime	P-value based on D prime
pval.delta	P-value based on delta (Devlin and Risch)
pval.Q	P-value based on Yule's Q
Prob	Probability under the null hypothesis of the observed table
LR	Likelihood ratio statistic
r	Correlation coefficient
Dprime	D prime
delta	delta (Devlin and Risch)
Q	Yule's Q
yobs	The observed n11 (first cell in the table)
n1	Row margin
n2	Column margin
nn	Sample size

Author(s)

Alex Lewin

References

Kulinskaya and Lewin 2008

See Also

[LD2sided.tables](#)

Examples

```
ctable <- c(0,9,5,16)
LD2sided.pvals(ctable)
```

LD2sided.tables	<i>Tables of p-values and Linkage Disequilibrium measures for all 2x2 tables possible under the null distribution.</i>
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Description

This function calculates p-values and Linkage Disequilibrium measures for all possible 2x2 contingency tables consistent with the margins of the input observed contingency table. See [LD2sided.pvals](#) for details of the Linkage Disequilibrium measures and tests used.

Usage

```
LD2sided.tables(ctable)
```

Arguments

`ctable` Vector of the 4 entries in the 2x2 contingency table

Details

This function prints out three tables. First lists all contingency tables consistent with the margins of the input table. Second lists the orderings of the contingency tables according to the different LD measures. Third gives the different LD p-values for all the contingency tables.

Value

Outputs the table of LD p-values for all the contingency tables consistent with the margins of the input table.

Author(s)

Alex Lewin

References

Kulinskaya and Lewin 2008

See Also

[LD2sided.pvals](#)

Examples

```
ctable <- c(0,9,5,16)
LD2sided.tables(ctable)
LD2sided.pvals(ctable)$pval.Fish
```

LDtests-package *Exact tests for Linkage Disequilibrium and Hardy-Weinberg Equilibrium*

Description

Exact tests for Linkage Disequilibrium (LD) and Hardy-Weinberg Equilibrium (HWE). - 2-sided LD tests based on different measures of LD (Kulinskaya and Lewin 2008) - 1-sided Fisher's exact test for LD - 2-sided Haldane test for HWE (Wigginton 2005) - 1-sided test for inbreeding - conditional p-values proposed in Kulinskaya (2008) to overcome the problems of asymmetric distributions (for both LD and HWE)

Details

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`LD2sided.pvals` calculates LD p-values for the input table `Fisher1sided` calculates Fisher's 1-sided p-values for LD for the input table `HWE2sided` calculates HWE p-values for the input table `LD2sided.tables` calculates LD p-values for an entire null distribution `HWE2sided.table` calculates HWE p-values for an entire null distribution

Author(s)

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References

Kulinskaya and Lewin 2008

Examples

```
ctable <- c(4,5,1,20)
LD2sided.tables(ctable)
LD2sided.pvals(ctable)$pval.Fish
```

```
Fisher1sided(ctable)$pval.Fish  
HWE2sided.table(maf=0.17,n=100)  
geno <- c(20,73,7)  
HWE2sided(geno)
```

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