Package 'ORCI'

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Type Package

Title Several confidence intervals for the odds ratio

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Author Libo Sun

Maintainer Libo Sun <Libo.Sun@colostate.edu>

Imports BiasedUrn, BlakerCI, PropCIs

Description

Computes various confidence intervals for the odds ratio of two independent binomial proportions.

License GPL-2

ByteCompile Yes

NeedsCompilation no

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ORCI-package *Confidence intervals for the odds ratio*

Description

Computes various confidence intervals for the odds ratio of two independent binomial proportions.

Details

Package:	ORCI
Type:	Package
Version:	1.1
Date:	2014-06-09
License:	GPL-2

Note

Miettinen-Nurminen confidence interval (Miettinen and Nurminen, 1985) is in 'PropCIs' package, and Blaker exact confidence interval (Fay, 2010a and 2010b) is in 'exact2x2' package.

Author(s)

Libo Sun

Maintainer: Libo Sun <Libo.Sun@colostate.edu>

References

Agresti, A. (1999). On logit confidence intervals for the odds ratio with small samples. Biometrics, 55(2):597-602.

Baptista, J. and Pike, M. (1977) Exact two-sided confidence limits for the odds ratio in a 2x2 table. Journal of the Royal Statistical Society. Series C (Applied Statistics), 26(2):214-220.

Blaker, H. (2000). Confidence curves and improved exact confidence intervals for discrete distributions. Canadian Journal of Statistics 28(4): 783-798.

Cornfield, J. (1956). A statistical problem arising from retrospective studies. In Proceedings of the third Berkeley symposium on mathematical statistics and probability, volume 4, pages 135-148. University of California Press Berkeley.

Donner, A. and Zou, G. (2012). Closed-form confidence intervals for functions of the normal mean and standard deviation. Statistical Methods in Medical Research, 21(4):347-359.

Fagerland, M. W. and Newcombe, R. G. (2013). Confidence intervals for odds ratio and relative risk based on the inverse hyperbolic sine transformation. Statistics in Medicine, 32(16): 2823-2836.

Fay, M. P. (2010a). Confidence intervals that Match Fisher's exact and Blaker's exact tests. Biostatistics, 11(2):373-374.

Fay, M. P. (2010b). Two-sided exact tests and matching confidence intervals for discrete data. The R Journal, 2(1):5357.

Gart, J. J. (1966). Alternative analyses of contingency tables. Journal of the Royal Statistical Society. Series B (Methodological), 28:164-179.

Lancaster, H. (1961). Significance tests in discrete distributions. Jornal of the American Statistical Association, 56(294):223-234.

Miettinen, O. and Nurminen, M. (1985). Comparative analysis of two rates. Statistics in Medicine 4(2):213-226.

Parzen, M., Lipsitz, S., Ibrahim, J., and Klar, N. (2002). An estimate of the odds ratio that always exists. Journal of Computational and Graphical Statistics, 11(2):430-436.

Woolf, B. (1955). On estimating the relation between blood group and disease. Annals of human genetics, 19(4):251-253.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Agrestiind.CI(2, 14, 1, 11)
BPexact.CI(2, 14, 1, 11)
BPmidp.CI(2, 14, 1, 11)
Cornfieldexact.CI(2, 14, 1, 11)
Cornfieldmidp.CI(2, 14, 1, 11)
Gart.CI(2, 14, 1, 11)
Invsinh.CI(2, 14, 1, 11, phi.1 = 0.6, phi.2 = 0.4)
MOVER.CI(2, 14, 1, 11)
MUE.CI(2, 14, 1, 11)
Woolf.CI(2, 14, 1, 11)
```

Agrestiind.CI *Compute Agresti independence confidence interval for the odds ratio*

Description

Compute Agresti independence-smoothed logit confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Agrestiind.CI(x1, n1, x2, n2, conf = 0.95)
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.

Author(s)

Libo Sun

References

Agresti, A. (1999). On logit confidence intervals for the odds ratio with small samples. Biometrics, 55(2):597-602.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Agrestiind.CI(2, 14, 1, 11)
```

BPexact.CI *Compute Baptista-Pike exact confidence interval for the odds ratio*

Description

Compute Baptista-Pike exact confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
BPexact.CI(x1, n1, x2, n2, conf = 0.95, interval = c(1e-08, 1e+08))
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.
interval	solution finding range.

Author(s)

Libo Sun

References

Baptista, J. and Pike, M. (1977) Exact two-sided confidence limits for the odds ratio in a 2x2 table. Journal of the Royal Statistical Society. Series C (Applied Statistics), 26(2):214-220.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

BPexact.CI(2, 14, 1, 11)
```

BPmidp.CI *Compute Baptista-Pike midp confidence interval for the odds ratio*

Description

Compute Baptista-Pike midp confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
BPmidp.CI(x1, n1, x2, n2, conf = 0.95, interval = c(1e-08, 1e+08))
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.
interval	solution finding range.

Author(s)

Libo Sun

References

Baptista, J. and Pike, M. (1977) Exact two-sided confidence limits for the odds ratio in a 2x2 table. Journal of the Royal Statistical Society. Series C (Applied Statistics), 26(2):214-220.

Lancaster, H. (1961). Significance tests in discrete distributions. Jornal of the American Statistical Association, 56(294):223-234.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

BPmidp.CI(2, 14, 1, 11)
```

`Cornfieldexact.CI` *Compute Cornfield exact confidence interval for the odds ratio*

Description

Compute Cornfield exact confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Cornfieldexact.CI(x1, n1, x2, n2, conf = 0.95, interval = c(1e-08, 1e+08))
```

Arguments

`x1`	number of events in group 1.
`n1`	number of trials in group 1.
`x2`	number of events in group 2.
`n2`	number of trials in group 2.
`conf`	confidence level.
`interval`	solution finding range.

Author(s)

Libo Sun

References

Cornfield, J. (1956). A statistical problem arising from retrospective studies. In Proceedings of the third Berkeley symposium on mathematical statistics and probability, volume 4, pages 135-148. University of California Press Berkeley.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Cornfieldexact.CI(2, 14, 1, 11)
```

`Cornfieldmidp.CI` *Compute Cornfield midp confidence interval for the odds ratio*

Description

Compute Cornfield midp confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Cornfieldmidp.CI(x1, n1, x2, n2, conf = 0.95, interval = c(1e-08, 1e+08))
```

Arguments

`x1`	number of events in group 1.
`n1`	number of trials in group 1.
`x2`	number of events in group 2.
`n2`	number of trials in group 2.
`conf`	confidence level.
`interval`	solution finding range.

Author(s)

Libo Sun

References

Cornfield, J. (1956). A statistical problem arising from retrospective studies. In Proceedings of the third Berkeley symposium on mathematical statistics and probability, volume 4, pages 135-148. University of California Press Berkeley.

Lancaster, H. (1961). Significance tests in discrete distributions. Jornal of the American Statistical Association, 56(294):223-234.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Cornfieldmidp.CI(2, 14, 1, 11)
```

Gart.CI *Compute Gart adjusted confidence interval for the odds ratio*

Description

Compute Gart adjusted confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Gart.CI(x1, n1, x2, n2, conf = 0.95)
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.

Author(s)

Libo Sun

References

Gart, J. J. (1966). Alternative analyses of contingency tables. Journal of the Royal Statistical Society. Series B (Methodological), 28:164-179.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Gart.CI(2, 14, 1, 11)
```

`Invsinh.CI` *Compute Inv-sinh confidence interval for the odds ratio*

Description

Compute Inverse hyperbolic sine confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Invsinh.CI(x1, n1, x2, n2, phi.1, phi.2, conf = 0.95)
```

Arguments

`x1`	number of events in group 1.
`n1`	number of trials in group 1.
`x2`	number of events in group 2.
`n2`	number of trials in group 2.
`phi.1`	>0
`phi.2`	>0
`conf`	confidence level.

Details

Fagerland and Newcombe (2013) suggests phi.1=0.45 and phi.2=0.25 and phi.1=0.6 and phi.2=0.4 for best performance.

Author(s)

Libo Sun

References

Fagerland, M. W. and Newcombe, R. G. (2013). Confidence intervals for odds ratio and relative risk based on the inverse hyperbolic sine transformation. Statistics in Medicine, 32(16): 2823-2836.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Invsinh.CI(2, 14, 1, 11, 0.6, 0.4)
```

MOVER.CI *Compute MOVER confidence interval for the odds ratio*

Description

Compute MOVER confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
MOVER.CI(x1, n1, x2, n2, conf = 0.95)
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.

Author(s)

Libo Sun

References

Donner, A. and Zou, G. (2012). Closed-form confidence intervals for functions of the normal mean and standard deviation. Statistical Methods in Medical Research, 21(4):347-359.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

MOVER.CI(2, 14, 1, 11)
```

MUE.CI *Compute MUE confidence interval for the odds ratio*

Description

Compute median unbiased estimator (MUE) based confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
MUE.CI(x1, n1, x2, n2, conf = 0.95)
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.

Author(s)

Libo Sun

References

Parzen, M., Lipsitz, S., Ibrahim, J., and Klar, N. (2002). An estimate of the odds ratio that always exists. Journal of Computational and Graphical Statistics, 11(2):430-436.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

MUE.CI(2, 14, 1, 11)
```

Woolf.CI *Compute Woolf confidence interval for the odds ratio*

Description

Compute Woolf confidence interval for the odds ratio of two independent binomial proportions.

Usage

```
Woolf.CI(x1, n1, x2, n2, conf = 0.95)
```

Arguments

x1	number of events in group 1.
n1	number of trials in group 1.
x2	number of events in group 2.
n2	number of trials in group 2.
conf	confidence level.

Author(s)

Libo Sun

References

Woolf, B. (1955). On estimating the relation between blood group and disease. Annals of human genetics, 19(4):251-253.

Examples

```
# x1=2, n1=14, x2=1, n2=11
# 95% confidence interval for the odds ratio

Woolf.CI(2, 14, 1, 11)
```

Index