

# Package ‘PropCIs’

August 29, 2016

**Type** Package

**Title** Various confidence interval methods for proportions

**Version** 0.2-5

**Date** 2014-04-10

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**Description** Computes two-sample confidence intervals for single, paired and independent proportions

**License** GPL

**URL** <https://github.com/shearer/PropCIs>

**BugReports** <https://github.com/shearer/PropCIs/issues>

**LazyLoad** yes

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2014-04-16 00:28:58

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PropCIs-package	<i>Confidence intervals for single, paired and independent proportions</i>
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## Description

Computes confidence intervals for single proportions as well as for differences in dependent and independent proportions, the odds-ratio and the relative risk in a 2x2 table. Intervals are available for independent samples and matched pairs. The functions are partly written by assistants of Alan Agresti, see website <http://www.stat.ufl.edu/~aa/cda/cda.html>.

## Details

Package:	PropCIs
Type:	Package
Version:	0.2-5
Date:	2014-04-10
License:	GPL=2
LazyLoad:	yes

## Author(s)

Ralph Scherer

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## References

Agresti, A., Coull, B. (1998) Approximate is better than exact for interval estimation of binomial proportions. *The American Statistician* 52, 119–126.

Agresti, A., Caffo, B.(2000) Simple and effective confidence intervals for proportions and difference of proportions result from adding two successes and two failures. *The American Statistician* 54 (4), 280–288.

Agresti, A. (2002) *Categorical Data Analysis*. Wiley, 2nd Edition.

Agresti, A. and Min, Y. (2005) Simple improved confidence intervals for comparing matched proportions *Statistics in Medicine* 24 (5), 729–740.

Agresti, A., Gottard, A. (2005) Randomized confidence intervals and the mid-P approach, discussion of article by C. Geyer and G. Meeden, *Statistical Science* 20, 367–371.

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- Miettinen OS, Nurminen M. (1985) Comparative analysis of two rates. *Statistics in Medicine* 4, 213–226.
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- Tango T. (1998) Equivalence test and confidence interval for the difference in proportions for the paired-sample design *Statistics in Medicine* 17, 891–908.
- Wilson, E. B. (1927) Probable inference, the law of succession, and statistical inference. *J. Amer. Stat. Assoc.* 22, 209–212.

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 acceptbin

*internal function*


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### Description

computes the Blaker acceptability of  $p$  when  $x$  is observed and  $X$  is  $\text{bin}(n, p)$

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 add4ci

*Agresti-Coull add-4 CI for a binomial proportion*


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### Description

Agresti-Coull add-4 CI for a binomial proportion, based on adding 2 successes and 2 failures before computing the Wald CI. The CI is truncated, when it overshoots the boundary

### Usage

add4ci(x, n, conf.level)

**Arguments**

x	number of successes
n	number of trials
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

conf.int	The confidence interval for the proportion
estimate	The estimator for the proportion

**References**

Agresti, A., Coull, B. (1998) Approximate is better than exact for interval estimation of binomial proportions. *The American Statistician* 52, 119–126.

Agresti, A., Caffo, B. (2000) Simple and effective confidence intervals for proportions and difference of proportions result from adding two successes and two failures. *The American Statistician* 54 (4), 280–288.

**Examples**

```
add4ci(x = 15, n = 112, conf.level = 0.95)
```

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addz2ci	<i>Agresti-Coull CI for a binomial proportion based on adding <math>z^2/2</math> successes and <math>z^2/2</math> failures before computing the Wald CI</i>
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**Description**

Agresti-Coull CI for a binomial proportion based on adding  $z^2/2$  successes and  $z^2/2$  failures before computing the Wald CI. The CI is truncated, when it overshoots the boundary.

**Usage**

```
addz2ci(x, n, conf.level)
```

**Arguments**

x	number of successes
n	number of trials
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

<code>conf.int</code>	The confidence intervall for the proportion
<code>estimate</code>	The estimator for the proportion

**References**

Agresti, A., Coull, B. (1998): Approximate is better than exact for interval estimation of binomial proportions. *The American Statistician* 52, 119–126.

**Examples**

```
add2ci(x = 15, n = 112, conf.level = 0.95)
```

---

<code>blakerci</code>	<i>Blaker's exact CI for a binomial proportion</i>
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**Description**

Blaker's exact CI for a binomial proportion

**Usage**

```
blakerci(x, n, conf.level, tolerance=1e-05)
```

**Arguments**

<code>x</code>	Number of successes
<code>n</code>	Total sample size
<code>conf.level</code>	Confidence level
<code>tolerance</code>	default tolerance

**Value**

A list with class `"htest"` containing the following components:

<code>conf.int</code>	The confidence intervall for the proportion
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**References**

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

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diffpropci.mp	<i>Adjusted Wald interval for a difference of proportions with matched pairs</i>
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### Description

Adjusted Wald interval for a difference of proportions with matched pairs. This is the interval called Wald+2 in Agresti and Min (2005). Adds 0.5 to each cell before constructing the Wald CI

### Usage

```
diffpropci.mp(b, c, n, conf.level)
```

### Arguments

b	off-diag count
c	off-diag count
n	sample size
conf.level	confidence coefficient $1 - \alpha$

### Details

The interval is truncated, when it overshoots the boundary

### Value

A list with class "htest" containing the following components:

conf.int	a confidence interval for the difference in proportions.
estimate	estimated difference in proportions

### References

Agresti, A. and Min, Y. (2005) Simple improved confidence intervals for comparing matched proportions. *Statistics in Medicine* 24 (5), 729–740.

### Examples

```
diffpropci.mp(b = 40, c = 20, n = 160, conf.level = 0.95)
```

---

diffpropci.Wald.mp      *Wald interval for a difference of proportions with matched pairs*

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**Description**

Wald interval for a difference of proportions with matched pairs.

**Usage**

```
diffpropci.Wald.mp(b, c, n, conf.level)
```

**Arguments**

b	off-diag count
c	off-diag count
n	sample size
conf.level	confidence coefficient

**Details**

The interval is truncated, when it overshoots the boundary

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
estimate	estimated difference in proportions $c-b/n$

**References**

D. G. Altman (1999) Practical statistics for medical research. London, Chapman & Hall

**Examples**

```
diffpropci.Wald.mp(b = 3, c = 9, n = 32, conf.level = 0.95)
```

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diffscoreci	<i>Score interval for difference of proportions</i>
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**Description**

Score interval for difference of proportions and independent samples ( $p_1 - p_2$ )

**Usage**

```
diffscoreci(x1, n1, x2, n2, conf.level)
```

**Arguments**

x1	success counts in sample 1
n1	sample size in sample 1
x2	success counts in sample 2
n2	sample size in sample 2
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
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**References**

- Agresti, A. (2002) *Categorical Data Analysis*. Wiley, 2nd Edition.
- Mee, RW. (1984) Confidence bounds for the difference between two probabilities. *Biometrics* 40, 1175–1176.
- Miettinen OS, Nurminen M. (1985) Comparative analysis of two rates. *Statistics in Medicine* 4, 213–226.
- Nurminen, M. (1986) Analysis of trends in proportions with an ordinally scaled determinant. *Biometrical J.* 28, 965–974



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exactci	<i>Clopper-Pearson exact CI</i>
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**Description**

Clopper-Pearson exact CI

**Usage**

```
exactci(x, n, conf.level)
```

**Arguments**

x	Number of successes
n	Total sample size
conf.level	Confidence level

**Value**

A list with class "htest" containing the following components:

conf.int	a confidence interval for the proportion
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**References**

Clopper, C. and Pearson, E.S. (1934) The use of confidence or fiducial limits illustrated in the case of the binomial. *Biometrika* 26, 404–413.

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limit	<i>internal function</i>
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**Description**

internal function of orscoreci

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midPci	<i>mid-P confidence interval adaptation of the Clopper-Pearson interval</i>
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**Description**

mid-P confidence interval adaptation of the Clopper-Pearson interval

**Usage**

```
midPci(x, n, conf.level)
```

**Arguments**

x	number of successes
n	number of trials
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
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**References**

Agresti, A., Gottard, A. (2005) Randomized confidence intervals and the mid-P approach, discussion of article by C. Geyer and G. Meeden, *Statistical Science* 20, 367–371.

**Examples**

```
midPci(x = 15, n = 112, conf.level = 0.95)
```

---

oddsratioci.mp	<i>Adapted binomial score confidence interval for the subject-specific odds ratio with matched pairs</i>
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**Description**

Adapted binomial score confidence interval for the subject-specific odds ratio with matched pairs. This uses the Wilson score CI for a binomial parameter with the off-diagonal counts.

**Usage**

```
oddsratioci.mp(b, c, conf.level)
```

**Arguments**

b	off-diagonal count
c	off-diagonal count
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
----------	--

**References**

A. Agresti and Y. Min, (2005) Simple improved confidence intervals for comparing matched proportions. *Statistics in Medicine* 24 (5), 729–740.

**Examples**

```
oddsratioci.mp(b = 40, c = 20, conf.level = 0.95)
```

---

orscoreci	<i>score confidence interval for an odds ratio in a 2x2 table [p1(1-p1)/(p2(1-p2))]</i>
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**Description**

score confidence interval for an odds ratio in a 2x2 table  $[p_1(1-p_1)/(p_2(1-p_2))]$

**Usage**

```
orscoreci(x1, n1, x2, n2, conf.level)
```

**Arguments**

x1	number of successes in sample 1
n1	sample size in sample 1
x2	number of successes in sample 2
n2	sample size in sample 2
conf.level	confidence coefficient $1 - \alpha$

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
----------	--

**References**

- Cornfield, J. (1956) A statistical problem arising from retrospective studies. In Neyman J. (ed.), *Proceedings of the third Berkeley Symposium on Mathematical Statistics and Probability* 4, pp. 135–148.
- Miettinen O. S., Nurminen M. (1985) Comparative analysis of two rates. *Statistics in Medicine* 4, 213–226.
- Agresti, A. 2002. *Categorical Data Analysis*. Wiley, 2nd Edition.

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riskscoreci	<i>score confidence interval for the relative risk in a 2x2 table</i>
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**Description**

score confidence interval for the relative risk in a 2x2 table

**Usage**

```
riskscoreci(x1, n1, x2, n2, conf.level)
```

**Arguments**

x1	number of successes in sample 1
n1	sample size in sample 1
x2	number of successes in sample 2
n2	sample size in sample 2
conf.level	confidence coefficient $1 - \alpha$

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
----------	--

**References**

- Nam, J. M. (1995) Confidence limits for the ratio of two binomial proportions based on likelihood scores: Non-iterative method. *Biom. J.* 37 (3), 375–379.
- Koopman PAR. (1985) Confidence limits for the ratio of two binomial proportions. *Biometrics* 40, 513–517.
- Miettinen OS, Nurminen M. (1985) Comparative analysis of two rates. *Statistics in Medicine* 4, 213–226.
- Nurminen, M. (1986) Analysis of trends in proportions with an ordinally scaled determinant. *Biometrical J* 28, 965–974
- Agresti, A. (2002) *Categorical Data Analysis*. Wiley, 2nd Edition.

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scoreci	<i>Wilson's confidence interval for a single proportion</i>
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**Description**

Wilson's confidence interval for a single proportion. Score CI based on inverting the asymptotic normal test using the null standard error

**Usage**

```
scoreci(x, n, conf.level)
```

**Arguments**

x	Number of successes
n	Total sample size
conf.level	Confidence level

**Value**

A list with class `"htest"` containing the following components:

conf.int	a confidence interval for the difference in proportions.
----------	--

**References**

Wilson, E.B. (1927) Probable inference, the law of succession, and statistical inference *J. Amer. Stat. Assoc* 22, 209–212

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scoreci.mp	<i>Tango's score confidence interval for a difference of proportions with matched pairs</i>
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---

**Description**

Tango's score confidence interval for a difference of proportions with matched pairs

**Usage**

```
scoreci.mp(b, c, n, conf.level)
```

**Arguments**

b	off-diagonal count
c	off-diagonal count
n	sample size
conf.level	confidence coefficient

**Value**

A list with class `"htest"` containing the following components:

`conf.int` a confidence interval for the difference in proportions.

**References**

Agresti, A. and Min, Y. (2005) Simple improved confidence intervals for comparing matched proportions *Statistics in Medicine* 24 (5), 729–740.

Tango T. (1998) Equivalence test and confidence interval for the difference in proportions for the paired-sample design *Statistics in Medicine* 17, 891–908

**Examples**

```
scoreci.mp(b = 40, c = 20, n = 160, conf.level = 0.95)
```

---

wald2ci	<i>Wald interval with the possibility to adjust according to Agresti, Caffo (2000) for difference in proportions and independent samples.</i>
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**Description**

Wald interval with the possibility to adjust according to Agresti, Caffo (2000) for difference in proportions and independent samples. The Agresti-Caffo interval adds 1 to  $x_1$  and  $x_2$  and adds 2 to  $n_1$  and  $n_2$ .

**Usage**

```
wald2ci(x1, n1, x2, n2, conf.level, adjust)
```

**Arguments**

<code>x1</code>	success counts in sample 1
<code>n1</code>	sample size in sample 1
<code>x2</code>	success counts in sample 2
<code>n2</code>	sample size in sample 2
<code>conf.level</code>	confidence coefficient
<code>adjust</code>	option to adjust the Wald interval to the Agresti-Caffo interval for better performance

**Details**

If `adjust=AC` is chosen, the standard Wald interval is modified to the Agresti-Caffo adjusted CI (American Statistician, 2000)

**Value**

A list with class `"htest"` containing the following components:

<code>conf.int</code>	a confidence interval for the difference in proportions.
<code>estimate</code>	estimated difference in proportions

**References**

Agresti, A. (2002) *Categorical Data Analysis*. Wiley, 2nd Edition. Agresti, A., Caffo, B.(2000) Simple and effective confidence intervals for proportions and difference of proportions result from adding two successes and two failures. *The American Statistician* 54 (4), 280–288.

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<code>z2stat</code>	<i>internal function</i>
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**Description**

internal function of `diffscoreci`

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