Package 'CoinMinD'

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Title Simultaneous Confidence Interval for Multinomial Proportion

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Description Methods for obtaining simultaneous confidence interval for multinomial proportion have been proposed by many authors and the present study include a variety of widely applicable procedures. Seven classical methods (Wilson, Quesenberry and Hurst, Goodman, Wald with and without continuity correction, Fitzpatrick and Scott, Sison and Glaz) and Bayesian Dirichlet models are included in the package. The advantage of MCMC pack has been exploited to derive the Dirichlet posterior directly and this also helps in handling the Dirichlet prior parameters. This package is prepared to have equal and unequal values for the Dirichlet prior distribution that will provide better scope for data analysis and associated sensitivity analysis.

License GPL-2

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`CoinMinD-package` *Confidence Interval for Multinomial Proportion - CoinMinD*

Description

Methods for obtaining simultaneous confidence interval for multinomial proportion have been proposed by many authors and the present study include a variety of widely applicable procedures. Seven classical methods (Wilson, Quesenberry and Hurst, Goodman, Wald with and without continuity correction, Fitzpatrick and Scott, Sison and Glaz) and Bayesian Dirichlet models are included in the package. The advantage of MCMC pack has been exploited to derive the Dirichlet posterior directly and this also helps in handling the Dirichlet prior parameters. This package is prepared to have equal and unequal values for the Dirichlet prior distribution that will provide better scope for data analysis and associated sensitivity analysis.

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Author(s)

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References

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for multinomial proportions. Computer Methods and Programs in Biomedicine 53: 153-162. 7. Quesenberry, C.P. and Hurst, D.C. (1964). Large Sample Simultaneous Confidence Intervals for Multinational Proportions. Technometrics, 6: 191-195. 8. Sison, P.C. and Glaz J. (1995). Simultaneous Confidence Intervals and Sample Size Determination for Multinomial Proportions. Journal of the American Statistical Association 90: 366-369. 9. Sangeetha, U Subbiah, M and Srinivasan M R (2013). Simultaneous confidence intervals for Multinomial proportions of sparse contingency tables. Communicated to Communications in Statistics - Simulation and Computation 10. Wang, H. (2008). Exact confidence coefficients of simultaneous confidence intervals for multinomial proportions. Journal of Multivariate Analysis 99: 896-911.

See Also

BMDE,BMDU,QH

Examples

```
y=c(44,55,43,32,67,78)
z=1
BMDE(y,z)
```

BMDE *Multinomial - Dirichlet (MD) model - Equal Prior - Bayes Methods*

Description

This method provides 95 percent simultaneous confidence interval for multinomial proportions based on Bayesian Multinomial Dirichlet model. This method assumes equal values for the Dirichlet prior parameters

Usage

```
BMDE(x, p)
```

Arguments

x	x refers to the cell counts of given contingency table corresponding to a categorical data - non negative integers
p	the equal value for the Dirichlet prior parameter - positive real number

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Gelman, A., Carlin, J.B., Stern, H.S., and Rubin, D.B. (2002). Bayesian Data Analysis. Chapman & Hall, London.

See Also

BMDU,FS,QH

Examples

```
y=c(44,55,43,32,67,78)
z=1
BMDE(y,z)
```

BMDU *Multinomial - Dirichlet (MD) model - UnEqual Prior - Bayes Methods*

Description

This method provides 95 percent simultaneous confidence interval for multinomial proportions based on Bayesian Multinomial Dirichlet model. However, it provides a mechanism through which user can split the Dirichlet prior parameter vector and suitable distributions can be incorporated for each of two groups.

Usage

```
BMDU(x, d)
```

Arguments

x	x refers to the cell counts of given contingency table corresponding to a categorical data - non negative integers
d	d is the number of divisions required to split the prior vector of Dirichlet distribution to assign unequal values from U(0,1) and U(1,2)

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

See Also

BMDE,GM,WS

Examples

```
y=c(44,55,43,32,67,78)
z=2
BMDU(y,z)
```

FS *Confidence Interval - Fitzpatrick and Scott*

Description

The simultaneous confidence interval for multinomial proportions based on the method proposed in Fitzpatrick and Scott (1987)

Usage

```
FS(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Fitzpatrick, S. and Scott, A. (1987). Quick simultaneous confidence interval for multinomial proportions. Journal of American Statistical Association 82(399): 875-878.

See Also

BMDE,WALD,WS

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
FS(y,z)
```

GM *Confidence Interval - Goodman*

Description

The simultaneous confidence interval for multinomial proportions based on the method proposed in Goodman (1965)

Usage

```
GM(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Goodman, L.A. (1965). On Simultaneous Confidence Intervals for Multinomial Proportions. Technometrics 7: 247-254.

See Also

BMDE,WALD,WS

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
GM(y,z)
```

QH *Confidence Interval -Quesenberry and Hurst*

Description

The simultaneous confidence interval for multinomial proportions based on the method proposed in Quesenberry and Hurst (1964)

Usage

```
QH(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Quesensberry, C.P. and Hurst, D.C. (1964). Large Sample Simultaneous Confidence Intervals for Multinational Proportions. Technometrics, 6: 191-195.

See Also

BMDE,WALD,WS

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
QH(y,z)
```

SG *Confidence Interval -Sison and Glaz*

Description

The simultaneous confidence interval for multinomial proportions based on the method proposed in Sison and Glaz (1995).

Usage

```
SG(x, alpha)
```

Arguments

x	x refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Sison, P.C. and Glaz J. (1995). Simultaneous Confidence Intervals and Sample Size Determination for Multinomial Proportions. Journal of the American Statistical Association 90: 366-369.

See Also

BMDE,WALD,GM

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
SG(y,z)
```

WALD *Confidence Interval -WALD*

Description

The simple Wald type interval for multinomial proportions which is symmetrical about the sample proportions. In this method no continuity corrections are made to avoid zero width intervals when the sample proportions are at extreme.

Usage

```
WALD(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

Wald, A Tests of statistical hypotheses concerning several parameters when the number of observations is large, Trans. Am. Math. Soc. 54 (1943) 426-482.

See Also

BMDE,WALDCC,SG

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
WALD(y,z)
```

WALDCC *Confidence Interval -WALDCC*

Description

The simple Wald type interval with continuity corrections for multinomial proportions which is symmetrical about the sample proportions.

Usage

```
WALDCC(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

See Also

BMDE,WALD,SG

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
WALDCC(y,z)
```

WS *Confidence Interval -Wilson (WS)*

Description

The simultaneous confidence interval for multinomial proportions based on the method proposed in Wilson (1927)

Usage

```
WS(inpmat, alpha)
```

Arguments

inpmat	inpmat refers to the cell counts of given contingency table corresponding to a categorical data
alpha	a number between 0 and 1 to get the upper 100(1-??) percentage point of the chi square distribution

Value

lower, upper limits of multinomial proportions together with product of length of k intervals as volume of simultaneous confidence intervals

Author(s)

Dr M Subbiah

References

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

See Also

BMDE,WALD,SG

Examples

```
y=c(44,55,43,32,67,78)
z=0.05
WS(y,z)
```

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