Package ‘multicmp’

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Type Package
Title Flexible Modeling of Multivariate Count Data via the Multivariate Conway-Maxwell-Poisson Distribution
Version 1.0
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Description A toolkit containing statistical analysis models motivated by multivariate forms of the Conway-Maxwell-Poisson (COM-Poisson) distribution for flexible modeling of multivariate count data, especially in the presence of data dispersion. Currently the package only supports bivariate data, via the bivariate COM-Poisson distribution described in Sellers et al. (2016) <doi:10.1016/j.jmva.2016.04.007>. Future development will extend the package to higher-dimensional data.
Imports stats, numDeriv
URL http://dx.doi.org/10.1016/j.jmva.2016.04.007
BugReports https://github.com/diagdavenport/multicmp/issues
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**accidents**  

*Shunter accidents*

**Description**

The number of accidents incurred by 122 shunters in two consecutive year periods, namely 1937 - 1942 and 1943 - 1947

**Usage**

`accidents`

**Format**

A dataframe with 122 rows and 2 variables:

- **x** Number of shunter accidents between 1937 and 1942
- **y** Number of shunter accidents between 1943 and 1947

**Source**

A. Arbous, J.E. Kerrick, Accident statistics and the concept of accident proneness, Biometrics 7 (1951) 340-432.

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**multicmpests**  

*Bivariate COM-Poisson Parameter Estimation*

**Description**

`multicmpests` computes the maximum likelihood estimates of a bivariate COM-Poisson distribution (based on the model described in Sellers et al. (2016)) for given count data and conducts a test for significant data dispersion, relative to a bivariate Poisson model. The bivariate Poisson case is addressed via the bivpois package by Karlis and Ntzoufras (2009).

**Usage**

`multicmpests(data, max = 100, startvalues = NULL)`

**Arguments**

- **data**: A two-column dataset of counts.
- **max**: Truncation term for infinite summation associated with the Z function. See Sellers et al. (2016) for details.
- **startvalues**: A vector of starting values for maximum likelihood estimation. The values are read as follows: c(lambda, nu, p00, p10, p01, p11). The default is c(1,1, 0.25, 0.25, 0.25, 0.25).
multicmpests will return a list of four elements: $par (Parameter Estimates), $negll (Negative Log-Likelihood), $LRTbpd (Dispersion Test Statistic), and $pbpd (Dispersion Test P-Value).

References


Examples

```r
x1 <- c(3,2,5,4,1)
x2 <- c(0,4,1,0,1)
ex.data <- cbind(x1,x2)

# starting close to the optimum for sake of run time
multicmpests(ex.data, startvalues = c(12.5 , 1.7 , 0, 0.25, 0.75, 0))
```
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