Package: cmpR (via r-universe)

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Type Package

Title Conway-Maxwell-Poisson Distribution Function

Version 0.0.2

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Description Provides functions for calculating the Conway-Maxwell-Poisson distribution function and variable simulation

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Encoding UTF-8

LazyData true

Imports Rcpp (>= 0.12.10)

LinkingTo Rcpp

RoxygenNote 7.1.2

Repository https://dsjohnson.r-universe.dev

RemoteUrl https://github.com/dsjohnson/cmpR

RemoteRef HEAD

RemoteSha 822e21e2be65aaa57b8b5d740b7e78c45ccb498e

Contents

cmpR-package *Functions for Conway-Maxwell-Poisson Distribution*

Description

Distribution and sampling fucntion are provided for the Conway-Maxwell-Poisson distribution. The 'mu' parameterization of Guikema and Goffelt (2008), where floor(mu) is the median of the distribution. The other parameter 'nu' controls over and underdispersion. For 0 < nu < 1, the distribution is overdispersed relative to a Poisson. For nu > 1, the distribution is underdispersed. For nu = 0, the distribution is equal to a geometric (for mu<1) and if nu = 1, the distribution is equal to the Poisson.

Package:	cmpR
Type:	Package
Version:	0.0.1
Date:	May 15, 2017
License:	CC0
LazyLoad:	yes

Note

This software package is developed and maintained by scientists at the NOAA Fisheries Alaska Fisheries Science Center and should be considered a fundamental research communication. The reccomendations and conclusions presented here are those of the authors and this software should not be construed as official communication by NMFS, NOAA, or the U.S. Dept. of Commerce. In addition, reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA. While the best efforts have been made to insure the highest quality, tools such as this are under constant development and are subject to change.

Author(s)

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References

Guikema, S.D. and Goffelt, J.P., 2008. A flexible count data regression model for risk analysis. Risk analysis, 28(1), pp.213-223.

dcmp *Conway-Maxwell-Poisson Distribution*

Description

Probability mass function and random generation for the Conway-Maxwell-Poisson distribution for given values of the parameters.

Usage

```
dcmp(x, mu, nu, log = FALSE)
```

Arguments

x	quantile at which the prob. mass function is evaluated.
mu	location parameter
nu	dispersion parameter
log	Logical. Whether or not the log PMF is returned.
n	number of random draws to return

Details

Computes PMF and makes random draws from the Conway-Maxwell-Poisson (CMP) distribution. The PMF of the CMP is given by

$$f(x) = (1/Z)((nu * mu)^x)/(x!^n u).$$

(Guikema and Goffelt 2008).

The normalizing constant is calculated using a combination of finite truncation of the infinite sum as well as an approximation provided by Shmueli et al. (2005) for small nu and large mu.

Author(s)

Devin S. Johnson and Jeffrey Dunn

References

Guikema, Seth D., and Jeremy P. Goffelt. "A flexible count data regression model for risk analysis." Risk analysis 28.1 (2008): 213-223.

Shmueli, Galit, et al. "A useful distribution for fitting discrete data: revival of the Conway–Maxwell–Poisson distribution." Journal of the Royal Statistical Society: Series C (Applied Statistics) 54.1 (2005): 127-142.

Examples

```
x = rcmp(1000, 10, 2)
plot(table(x)/length(x))
pmf = dcmp(x, 10, 2)
points(x, pmf)
```

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