Package 'coga'

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Title Convolution of Gamma Distributions

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Description Convolution of gamma distributions in R. The convolution of
gamma distributions is the sum of series of gamma
distributions and all gamma distributions here can have different
parameters. This package can calculate density, distribution function
and do simulation work.

Depends R (>= 3.3.1)

License GPL (>= 3.0)

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Suggests knitr, rmarkdown, testthat, microbenchmark

VignetteBuilder knitr

Imports stats, Rcpp

LinkingTo Rcpp

BugReports https://bitbucket.org/chaoranhu/coga/issues

URL https://bitbucket.org/chaoranhu/coga

NeedsCompilation yes

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R topics documented:

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coga   *coga: A package for computing convolution of gamma distributions*

Description

A calculation of convolution of gamma distributions in R. The convolution of gamma distributions is the sum of series of gamma distributions and all gamma distributions here can have different parameters. This package can calculate density, distribution function and do simulation work.

coga functions

dcoga, pcoga, and rcoga

Author(s)

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dcoga   *Convolution of Gamma Distributions.*

Description

Density, distribution function, and random generation for convolution of gamma distributions. The distribution of the convolution of independent Gamma random variables with different parameters is $Y = X_1 + ... + X_n$, where $X_i, i = 1, ..., n$, are independent Gamma distributions with parameters shapes and rates. The density function and distribution function can be calculated, according to the formulas from Moschopoulos, Peter G. (1985).

Usage

```
dcoga(x, shape, rate)

pcoga(x, shape, rate)

rcoga(n, shape, rate)
```

Arguments

x	Quantiles.
shape	Numerical vector of shape parameters of every gamma distributions, all shape parameters >= 0, at least one shape parameter > 0.
rate	Numerical vector of rate parameters of every gamma distributions, all rate parameters > 0.
n	Number of sample.

Author(s)

Chaoran Hu

References

Moschopoulos, Peter G. "The distribution of the sum of independent gamma random variables." Annals of the Institute of Statistical Mathematics 37.1 (1985): 541-544.

Examples

```
set.seed(123)
## do grid
y <- rcoga(100000, c(3,4,5), c(2,3,4))
grid <- seq(0, 15, length.out=100)
## calculate pdf and cdf
pdf <- dcoga(grid, shape=c(3,4,5), rate=c(2,3,4))
cdf <- pcoga(grid, shape=c(3,4,5), rate=c(2,3,4))

## plot pdf
plot(density(y), col="blue")
lines(grid, pdf, col="red")

## plot cdf
plot(ecdf(y), col="blue")
lines(grid, cdf, col="red")
```

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