Package: cnbdistr (via r-universe)

November 10, 2026

Type Package

Title Conditional Negative Binomial Distribution

Version 1.0.1

Date 2017-07-04

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Description Provided R functions for working with the Conditional Negative Binomial distribution.

License GPL-3

Depends R (>= 3.2.2)

Imports hypergeo (>= 1.2-13), stats (>= 3.3.2)

Suggests rmutil (>= 1.1.0), testthat (>= 1.0.2), knitr (>= 1.16), rmarkdown (>= 1.6)

NeedsCompilation no

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

VignetteBuilder knitr

Config/pak/sysreqs pari-gp

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

Date/Publication 2017-07-19 05:18:16 UTC

RemoteUrl https://github.com/xiaotianzhu/cnbdistr

RemoteRef HEAD

RemoteSha ea2fed311daba1a54fc305507b271d3aa1fa23ac

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dcnb *PMF of Conditional Negative Binomial*

Description

Probability mass function of the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
dcnb(x, D, r1, r2, theta)
```

Arguments

x	a nonempty vector of non-negative integer(s) <= D.
D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

A vector providing values of Pr(X = x | X + Y = D) for each element in x.

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

pcnb, qcnb, rcnb.

Examples

```
dcnb(980, 2000, 120, 90, 0.994)
dcnb(0:7, 7, 2, 0.4, 0.6)
```

---

mu_cnb *Mean of Conditional Negative Binomial*

Description

Function calculating mean of the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
mu_cnb(D, r1, r2, theta)
```

Arguments

D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

E(X | X + Y = D).

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

sigma2_cnb

Examples

```
mu_cnb(7, 2, 0.4, 0.6)
```

pcnb *CDF of Conditional Negative Binomial*

Description

Cumulative distribution function of the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
pcnb(x, D, r1, r2, theta)
```

Arguments

x	a nonempty vector of real numbers.
D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

A vector providing values of Pr(X <= x | X + Y = D) for each element in x.

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

dcnb, qcnb, rcnb.

Examples

```
pcnb(980, 2000, 120, 90, 0.994)
pcnb(0:7, 7, 2, 0.4, 0.6)
```

qcnb *Quantile Function of Conditional Negative Binomial*

Description

Quantile function of the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
qcnb(p, D, r1, r2, theta)
```

Arguments

p	a nonempty vector of probabilities (0 <= p[i] <= 1 for all i).
D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

A vector x such that x[i] = Inf{x in 0:D, p[i] <= Pr(X <= x | X + Y = D)} for all i.

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

dcnb, pcnb, rcnb.

Examples

```
qcnb(0.035193, 2000, 120, 90, 0.994)
qcnb(seq(0, 1, 0.05), 7, 2, 0.4, 0.6)
```

rcnb *Random Number Generation from Conditional Negative Binomial*

Description

Random number generation from the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
rcnb(n, D, r1, r2, theta)
```

Arguments

n	a positive integer.
D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

n iid draws from X|X+Y=D.

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

dcnb, pcnb, qcnb.

Examples

```
x <- rcnb(1e3, 7, 2, 0.4, 0.6)
hist(x)
```

sigma2_cnb *Variance of Conditional Negative Binomial*

Description

Function calculating variance of the conditional distribution of X given X + Y = D, where X ~ NB(r1, p1) and Y ~ NB(r2, p2) are drawn from two negative binomials, independent of each other, and assuming p1/p2 = theta.

Usage

```
sigma2_cnb(D, r1, r2, theta)
```

Arguments

D	a positive integer.
r1	a positive value.
r2	a positive value.
theta	a positive value.

Details

Need to specify full list of arguments, as default values have not been set.

Value

V(X | X + Y = D).

Author(s)

Xiaotian Zhu, <xiaotian.zhu.psualum@gmail.com>

See Also

mu_cnb

Examples

```
sigma2_cnb(7, 2, 0.4, 0.6)
```

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