Package 'triangle'

February 15, 2019

Title Provides the Standard Distribution Functions for the Triangle Distribution

Version 0.12

Description Provides the ``r, q, p, and d'' distribution functions for the triangle distribution.

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URL https://bertcarnell.github.io/triangle/

BugReports https://github.com/bertcarnell/triangle/issues

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Depends R (>= 2.14.1)

Collate 'dtriangle.R' 'ltriangle.r' 'ptriangle.r' 'qtriangle.R' 'rtriangle.r'

Suggests testthat, knitr, rmarkdown, covr

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

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R topics documented:

ltriangle *The Log-Triangle Distribution*

Description

These functions provide information about the triangle distribution on the logarithmic interval from a to b with a maximum at c. dltriangle gives the density, pltriangle gives the distribution function, qltriangle gives the quantile function, and rltriangle generates n random deviates.

Usage

```
rltriangle(n = 1, a = 1, b = 100, c = 10^((log10(a) + log10(b))/2),
  logbase = 10)

dltriangle(x, a = 1, b = 100, c = 10^((log10(a) + log10(b))/2),
  logbase = 10)

pltriangle(q, a = 1, b = 100, c = 10^((log10(a) + log10(b))/2),
  logbase = 10)

qltriangle(p, a = 1, b = 100, c = 10^((log10(a) + log10(b))/2),
  logbase = 10)
```

Arguments

n	number of observations. If length(n) > 1, the length is taken to be the number required.
a	lower limit of the distribution.
b	upper limit of the distribution.
c	mode of the distribution.
logbase	the base of the logarithmic scale to use (default to 10)
x, q	vector of quantiles.
p	vector of probabilities.

Details

All probabilities are lower tailed probabilties. a, b, and c may be appropriate length vectors except in the case of rtriangle.

Value

dltriangle gives the density, pltriangle gives the distribution function, qltriangle gives the quantile function, and rltraingle generates random deviates. Invalid arguments will result in return value NaN or NA.

References

Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) *The New S Language*. Wadsworth \& Brooks/Cole.

See Also

`.Random.seed` about random number generation, `runif`, etc for other distributions.

Examples

```
tri <- rltriangle(100000, 1, 100, 10)
hist(log10(tri), breaks=100, main="Triangle Distribution", xlab="x")
dltriangle(10, 1, 100, 10) # 2/(log10(b)-log10(a)) = 1
qltriangle(pltriangle(10)) # 10
```

`triangle` *The Triangle Distribution*

Description

These functions provide information about the triangle distribution on the interval from `a` to `b` with a maximum at `c`. `dtriangle` gives the density, `ptriangle` gives the distribution function, `qtriangle` gives the quantile function, and `rtriangle` generates `n` random deviates.

Usage

```
dtriangle(x, a = 0, b = 1, c = (a + b)/2)

ptriangle(q, a = 0, b = 1, c = (a + b)/2)

qtriangle(p, a = 0, b = 1, c = (a + b)/2)

rtriangle(n = 1, a = 0, b = 1, c = (a + b)/2)
```

Arguments

`x, q`	vector of quantiles.
`a`	lower limit of the distribution.
`b`	upper limit of the distribution.
`c`	mode of the distribution.
`p`	vector of probabilities.
`n`	number of observations. If `length(n) > 1`, the length is taken to be the number required.

Details

All probabilities are lower tailed probabilities. a, b, and c may be appropriate length vectors except in the case of rtriangle. rtriangle is derived from a draw from runif. The triangle distribution has density:

$$f(x) = \frac{2(x-a)}{(b-a)(c-a)}$$

for $a \leq x < c$.

$$f(x) = \frac{2(b-x)}{(b-a)(b-c)}$$

for $c \leq x \leq b$. $f(x) = 0$ elsewhere. The mean and variance are:

$$E(x) = \frac{(a+b+c)}{3}$$

$$V(x) = \frac{1}{18}(a^2 + b^2 + c^2 - ab - ac - bc)$$

Value

dtriangle gives the density, ptriangle gives the distribution function, qtriangle gives the quantile function, and rtriangle generates random deviates. Invalid arguments will result in return value NaN or NA.

References

Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) *The New S Language*. Wadsworth \& Brooks/Cole.

See Also

.Random.seed about random number generation, runif, etc for other distributions.

Examples

```
## view the distribution
tri <- rtriangle(100000, 1, 5, 3)
hist(tri, breaks=100, main="Triangle Distribution", xlab="x")
mean(tri) # 1/3*(1 + 5 + 3) = 3
var(tri)  # 1/18*(1^2 + 3^2 + 5^2 - 1*5 - 1*3 - 5*3) = 0.666667
dtriangle(0.5, 0, 1, 0.5) # 2/(b-a) = 2
qtriangle(ptriangle(0.7)) # 0.7
```

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