Package ‘triangle’

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Type Package
Title Provides the Standard Distribution Functions for the Triangle Distribution
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Description Provides the "r, q, p, and d" distribution functions for the triangle distribution.
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triangle-package  Triangle Distributions

Description
Contains distribution functions for the triangle distribution and triangle distribution on a lognormal scale
The Logarithmic Triangle Distribution

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

Usage

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

Arguments

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

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

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

Author(s)
Rob Carnell

References
See Also

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

Examples

```r
## view the distribution
tri <- rtriangle(100000, 1, 100, 10)
hist(log10(tri), breaks=100, main="Triangle Distribution", xlab="x")

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

Arguments

- `x, q` vector of quantiles.
- `p` vector of probabilities.
- `a` lower limit of the distribution.
- `b` upper limit of the distribution.
- `c` mode of the distribution.
- `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.

Author(s)

Rob Carnell

References


See Also

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

Examples

```r
## 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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