Package ‘triangle’

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Type Package

Title Provides the Standard Distribution Functions for the Triangle Distribution

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Depends R (>= 2.14.1)

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 ltriangle *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. dltriangle gives the density, pltriangle gives the distribution function, qltriangle gives the quantile function, and rltriangle generates n random deviates.

Usage

```
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)
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 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.

Author(s)

Rob Carnell

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 <- 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, 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 $a \le x < c$.

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

for $c \le x \le b$. $f(x) = 0$ 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

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
```

Index