

Package ‘truncdist’

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Author Frederick Novomestky <fn334@nyu.edu>,
Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

Maintainer Frederick Novomestky <fnovomes@poly.edu>

Depends R (>= 2.0.1), stats4, evd

Description A collection of tools to evaluate probability density functions, cumulative distribution functions, quantile functions and random numbers for truncated random variables. These functions are provided to also compute the expected value and variance. Nadarajah and Kotz (2006) developed most of the functions. QQ plots can be produced. All the probability functions in the stats, stats4 and evd packages are automatically available for truncation..

Title Truncated Random Variables

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`dtrunc`*Probability density function of truncated random variables*

Description

This function computes values for the probability density function of a truncated random variable.

Usage

```
dtrunc(x, spec, a = -Inf, b = Inf, ...)
```

Arguments

<code>x</code>	A numeric vector of quantile values
<code>spec</code>	a character value that specifies the underlying probability distribution
<code>a</code>	a numeric value for the lower bound of the random variable
<code>b</code>	a numeric value for the upper bound of the random variable
<code>...</code>	other arguments are are passed to the corresponding quantile function

Details

The R function is used to access the required probability density and cumulative distribution functions of the underlying unrestricted random variable.

Value

A vector of density function values.

Author(s)

Frederick Novomestky <fnovomes@poly.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

Examples

```
x <- seq( 0, 3, .1 )  
pdf <- dtrunc( x, spec="norm", a=1, b=2 )
```

extrunc	<i>Expected value of a truncated random variable</i>
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Description

This function computes the expected value of a truncated random variable using numerical integration.

Usage

```
extrunc(spec, a = -Inf, b = Inf, ...)
```

Arguments

spec	a character value that specifies the underlying probability distribution
a	a numeric value for the lower bound of the random variable
b	a numeric value for the upper bound of the random variable
...	other arguments are are passed to the corresponding quantile function

Details

Numerical integration of the truncated density function is performed to compute the expected value.

Value

A numerical value for the expectation.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

See Also

[dtrunc](#)

Examples

```
mu <- extrunc( spec="norm",a=1, b=2 )
```

ptrunc

Cumulative distribution function of a truncated random variable

Description

This function compute values of the cumulative distribution function for truncated random variables.

Usage

```
ptrunc(q, spec, a = -Inf, b = Inf, ...)
```

Arguments

q	a numeric vector of quantile values
spec	a character value that specifies the underlying probability distribution
a	a numeric value for the lower bound of the random variable
b	a numeric value for the upper bound of the random variable
...	other arguments are are passed to the corresponding quantile function

Value

A vector of probability values.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

See Also

[dtrunc](#)

Examples

```
x <- seq( 0, 3, .1 )  
cdf <- ptrunc( x, spec="norm", a=1, b=2 )
```

`qqtrunc`*QQ Plot for a Truncated Random Variable*

Description

This function produces a QQ plot of sample quantiles against theoretical quantiles for a truncated random variable.

Usage

```
qqtrunc(x, spec, a = -Inf, b = Inf, title = "Truncated Distribution Q-Q Plot",  
        xlabel = "Theoretical Quantiles", ylabel = "Sample Quantiles", ...)
```

Arguments

<code>x</code>	a numeric vector of sample values
<code>spec</code>	a character value that specifies the underlying probability distribution
<code>a</code>	a numeric value for the lower bound of the random variable
<code>b</code>	a numeric value for the upper bound of the random variable
<code>title</code>	A character value for the chart title
<code>xlabel</code>	A character value for the horizon axis label
<code>ylabel</code>	A character value for the vertical axis label
<code>...</code>	other arguments are are passed to the corresponding quantile function

Value

A plot.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

See Also

[qtrunc](#)

Examples

```
x <- rtrunc( 500, spec="norm", a=1, b=2 )  
qqtrunc( x, spec="norm", a=1, b=2 )
```

`qtrunc`*Quantile Function for Truncated Random Variable*

Description

This function evaluates the inverse of the cumulative distribution function for a truncated random variable or so the so called quantile function for a given vector of probabilities and the specified distribution.

Usage

```
qtrunc(p, spec, a = -Inf, b = Inf, ...)
```

Arguments

<code>p</code>	A vector of probabilities
<code>spec</code>	a character value that specifies the underlying probability distribution
<code>a</code>	a numeric value for the lower bound of the random variable
<code>b</code>	a numeric value for the upper bound of the random variable
<code>...</code>	other arguments are are passed to the corresponding quantile and distribution function

Value

A vector of quantile values in the range of the truncated random variable.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

Examples

```
p <- seq( .1, .9, .01 )  
q <- qtrunc( p, spec="norm", a=1, b=2 )
```

rtrunc *Generate truncated random deviates*

Description

This function generates n random deviates that are drawn from the specified truncated distribution.

Usage

```
rtrunc(n, spec, a = -Inf, b = Inf, ...)
```

Arguments

n	a positive integer for the number of random deviates generated
spec	a character value that specifies the underlying probability distribution
a	a numeric value for the lower bound of the random variable
b	a numeric value for the upper bound of the random variable
...	other arguments are are passed to the corresponding quantile function

Value

A vector with one or more random deviates.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

See Also

[qtrunc](#)

Examples

```
x <- rtrunc( 500, spec="norm", a=1, b=2 )
```

`vartrunc`*Variance of a truncated random variable*

Description

This function estimates the variance of a truncated random variable using numerical integration.

Usage

```
vartrunc(spec, a = -Inf, b = Inf, ...)
```

Arguments

<code>spec</code>	a character value that specifies the underlying probability distribution
<code>a</code>	a numeric value for the lower bound of the random variable
<code>b</code>	a numeric value for the upper bound of the random variable
<code>...</code>	other arguments are are passed to the corresponding quantile function

Details

Numerical integration of the truncated density function is performed to compute the variance and the associated expected value.

Value

A numeric value.

Author(s)

Frederick Novomestky <fn334@nyu.edu>

Saralees Nadarajah <saralees.nadarajah@manchester.ac.uk>

References

Nadarajah, S. and S. Kotz, 2006. R Programs for Computing Truncated Distributions, *Journal of Statistical Software*, 16, August 2006, <http://www.jstatsoft.org/v16/c02>

See Also

[extrunc](#), [dtrunc](#)

Examples

```
var <- vartrunc( spec="norm", a=1, b=2 )
```

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