

TNEPDF**PURPOSE**

Compute the truncated exponential probability density function.

DESCRIPTION

A truncated exponential distribution is an exponential distribution that excludes values exceeding a certain threshold value (i.e., truncation from above). The truncated exponential distribution has the following probability density function:

$$f(x, x_0, \mu, \sigma) = \frac{e^{-\frac{(x-\mu)}{\sigma}}}{\sigma \left(1 - e^{-\frac{(x_0-\mu)}{\sigma}}\right)} \quad \mu < x < x_0 \quad (\text{EQ Aux-311})$$

where μ and σ are the location and scale parameters of the parent exponential distribution and x_0 is the truncation threshold.

SYNTAX

LET <y> = TNEPDF(<x>,<x0>,<m>,<s>) <SUBSET/EXCEPT/FOR qualification>

where <x> is a number, parameter, or variable in the range (<m>,<x0>);

<x0> is a number, parameter, or variable that defines the truncation threshold;

<m> is a number, parameter, or variable that defines the location parameter of the parent exponential distribution;

<s> is a number, parameter, or variable that defines the scale parameter of the parent exponential distribution;

<y> is a variable or a parameter (depending on what <x> is) where the computed truncated exponential pdf value is stored;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = TNEPDF(3,2,0.7,10)

LET X2 = TNEPDF(X1,THETA,SCALE,X0)

NOTE

Truncating an exponential distribution from below results in an exponential distribution with the same scale parameter. The truncation point simply defines a new location parameter.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

TNECDF	=	Compute the truncated exponential cumulative distribution function.
TNEPPF	=	Compute the truncated exponential percent point function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential percent point function.

REFERENCE

“Continuous Univariate Distributions - 1,” 2nd Ed., Johnson, Kotz, and Balakrishnan, Wiley and Sons, 1994 (page 554).

APPLICATIONS

Reliability

IMPLEMENTATION DATE

95/10

PROGRAM

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MULTIPLY 2 2; MULTIPLY CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
.
LET U = 0
LET S = 10
LET X0 = 30
X1LABEL U = ^U, S = ^S, X0 = ^X0
PLOT TNEPDF(x,x0,u,s) for x = u 0.1 x0
LET U = 0
LET S = 2
LET X0 = 3
X1LABEL U = ^U, S = ^S, X0 = ^X0
PLOT TNEPDF(x,x0,u,s) for x = u 0.1 x0
LET U = 2
LET S = 5
LET X0 = 14
X1LABEL U = ^U, S = ^S, X0 = ^X0
PLOT TNEPDF(x,x0,u,s) for x = u 0.1 x0
LET U = 0
LET S = 0.5
LET X0 = 1
X1LABEL U = ^U, S = ^S, X0 = ^X0
PLOT TNEPDF(x,x0,u,s) for x = u 0.1 x0
END OF MULTIPLY
    
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