GEXPPF

PURPOSE

Compute the generalized exponential percent point function.

DESCRIPTION

The generalized exponential distribution has the following probability density function:

$$f(x, \lambda_1, \lambda_{12}, s) = (\lambda_1 + \lambda_{12}(1 - e^{-sx}))e^{\lambda_1 x - \lambda_{12} x + \frac{\lambda_{12}}{s}(1 - e^{-sx})} \qquad x \geq 0 \qquad \textbf{(EQ Aux-169)}$$

where λ_1, λ_{12}, and s are positive shape parameters.

The percent point function is the inverse of the cumulative distribution function. The cumulative distribution sums the probability from 0 to the given x value (i.e., the integral of the above function). The percent point function takes a cumulative probability value and computes the corresponding x value. The percent point function is calculated numerically using a bisection method.

This distribution is the marginal distribution for a joint bivariate exponential distribution proposed in a paper by Ryu (see the Reference section below).

SYNTAX

LET <y> = GEXPPF(<p>,<l1>,<l12>,<s>) <SUBSET/EXCEPT/FOR qualification>

where <p> is a variable, a number, or a parameter in the range (0,1);

<y> is a variable or a parameter (depending on what <x> is) where the computed generalized exponential ppf value is saved;

<l1> is variable, a number, or a parameter that specifies the first shape parameter;

<l12> is variable, a number, or a parameter that specifies the second shape parameter;

<s> is variable, a number, or a parameter that specifies the third shape parameter;

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

EXAMPLES

LET A = GEXPPF(0.95,0.5,2,1.5)

LET X2 = GEXPPF(X1,LAM1,LAM12,SD)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

GEXCDF	=	Compute the generalized exponential cumulative distribution function.
GEXPDF	=	Compute the generalized exponential probability density function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential percent point function.
DEXCDF	=	Compute the double exponential cumulative distribution function.
DEXPDF	=	Compute the double exponential probability density function.
DEXPPF	=	Compute the double exponential percent point function.
WEICDF	=	Compute the Weibull cumulative distribution function.
WEIPDF	=	Compute the Weibull probability density function.
WEIPPF	=	Compute the Weibull percent point function.

REFERENCE

"An Extension of Marshall and Olkin's Bivariate Exponential Distribution," Ryu, Journal of the American Statistical Association, 1993, (pp. 1458-1465).

"Continuous Univariate Distributions--Vol. I," 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994, (page 555).

APPLICATIONS

Reliability

IMPLEMENTATION DATE

96/2

PROGRAM

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MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
Y1LABEL X
X1LABEL PROBABILITY
.
PLOT GEXPPF(P,0.1,0.1,0.5) FOR P = 0 0.01 0.99
PLOT GEXPPF(P,0.5,0.5,2) FOR P = 0 0.01 0.99
PLOT GEXPPF(P,5,0.5,2) FOR P = 0 0.01 0.99
PLOT GEXPPF(P,0.5,5,2) FOR P = 0 0.01 0.99
END OF MULTIPLOT
```