GEXCDF

PURPOSE
Compute the generalized exponential cumulative distribution function.

DESCRIPTION
The generalized exponential distribution has the following probability density function:

$$f(x, \lambda_1, \lambda_{12}, s) \; = \; (\lambda_1 + \lambda_{12}(1 - e^{-sx}))e^{\lambda_1 x - \lambda_{12} x + \frac{\lambda_{12}}{s}(1 - e^{-sx})} \qquad x \geq 0 \qquad \textbf{(EQ Aux-166)}$$

where l1, l12, and s are positive shape parameters. The cumulative distribution has the formula:

$$F(x, \lambda_1, \lambda_{12}, s) \; = \; 1 - e^{\lambda_1 x - \lambda_{12} x + \frac{\lambda_{12}}{s}(1 - e^{-sx})} \qquad x \geq 0 \qquad \textbf{(EQ Aux-167)}$$

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> = GEXCDF(<x>,<l1>,<l12>,<s>)   <SUBSET/EXCEPT/FOR qualification>

where <x> is a variable, a number, or a parameter;

  <y> is a variable or a parameter (depending on what <x> is) where the computed generalized exponential pdf 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 = GEXCDF(3,0.5,2,1.5)
LET X2 = GEXCDF(X1,LAM1,LAM12,SD)

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS

GEXPDF	=	Compute the generalized exponential probability density function.
GEXPPF	=	Compute the generalized 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.
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

     MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
     TITLE AUTOMATIC
     X1LABEL X
     Y1LABEL PROBABILITY
     .
     PLOT GEXCDF(X,0.1,0.1,0.5) FOR X = 0 0.01 10
     PLOT GEXCDF(X,0.5,0.5,2) FOR X = 0 0.01 10
     PLOT GEXCDF(X,5,0.5,2) FOR X = 0 0.01 10
     PLOT GEXCDF(X,0.5,5,2) FOR X = 0 0.01 10
     END OF MULTIPLOT