

**GEXPDF****PURPOSE**

Compute the generalized exponential probability density function.

**DESCRIPTION**

The generalized exponential distribution has the following probability density function:

$$f(x, \lambda_1, \lambda_{12}, s) = (\lambda_1 + \lambda_{12}(1 - e^{-sx}))e^{\lambda_1 x - \lambda_{12} x + \frac{\lambda_{12}}{s}(1 - e^{-sx})} \quad x \geq 0 \quad \text{(EQ Aux-168)}$$

where  $\lambda_1$ ,  $\lambda_{12}$ , and  $s$  are positive shape parameters. 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> = GEXPDF(<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 = GEXPDF(3,0.5,2,1.5)

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

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

GEXCDF	=	Compute the generalized exponential cumulative distribution 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

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

