DEXCDF

PURPOSE

Compute the standard form of the double exponential (also known as the Laplace distribution) cumulative distribution function.

DESCRIPTION

The standard form of the double exponential probability density function is:

$$f(x) = \frac{e^{-|x|}}{2} \qquad \textbf{(EQ 8-144)}$$

The standard form of the double exponential cumulative distribution function is:

$$F(x) = \frac{e^{x}}{2} \qquad \text{for } x < 0 \qquad \textbf{(EQ 8-145)}$$

$$F(x) = 1 - \frac{e^{-x}}{2} \qquad \text{for } x \geq 0 \qquad \textbf{(EQ 8-146)}$$

The input value can be any real number.

SYNTAX

LET <y2> = DEXCDF(<y1>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a variable, a number, or a parameter;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed double exponential cdf value is saved;

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

EXAMPLES

LET A = DEXCDF(3)

LET Y = DEXCDF(X1)

NOTE

The general form of the double exponential probability density function is:

$$f(x) = \frac{e^{\frac{-|x-\mu|}{\beta}}}{2\beta} \qquad \textbf{(EQ 8-147)}$$

The general form of the double exponential cumulative distribution function is:

$$F(x) = \frac{e^{\left(\frac{-(\mu - x)}{\beta}\right)}}{2} \qquad \text{for } x < 0 \qquad \textbf{(EQ 8-148)}$$

$$F(x) = 1 - \frac{e^{\left(\frac{-(x - \mu)}{\beta}\right)}}{2} \qquad \text{for } x \geq 0 \qquad \textbf{(EQ 8-149)}$$

The parameter μ is a location parameter and the parameter β is a scale parameter. See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating cdf values for the general form of the distribution.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

DEXPDF = Compute the double exponential probability density function.

DEXPPF	=	Compute the double exponential percent point function.
DEXSF	=	Compute the double exponential sparsity function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the 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.
EV1CDF	=	Compute the extreme value type I cumulative distribution function.
EV1PDF	=	Compute the extreme value type I probability density function.
EV1PPF	=	Compute the extreme value type I percent point function.

REFERENCE

"Continuous Univariate Distributions - 2," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 23).

"Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegum, National Bureau of Standards, 1964 (page 930).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/4

PROGRAM

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YLIMITS 0 1
YTIC DECIMAL 1
MAJOR YTIC NUMBER 6
MINOR YTIC NUMBER 1
XLIMITS -4 4; XTIC OFFSET 0.6 0.6
TITLE AUTOMATIC; X1LABEL X; Y1LABEL PROBABILITY
PLOT DEXCDF(X) FOR X = -4.5 0.01 4.5
```