

LOGPDF**PURPOSE**

Compute the standard logistic (i.e, mean=0, sd= $\pi/\sqrt{3}$) probability density function.

DESCRIPTION

The standard form of the logistic probability density function is:

$$f(x) = \frac{e^{-x}}{(1 + e^{-x})^2} \quad (\text{EQ 8-263})$$

SYNTAX

LET <y2> = LOGPDF(<y1>) <SUBSET/EXCEPT/FOR qualification>
 where <y1> is a variable or a parameter;
 <y2> is a variable or a parameter (depending on what <y1> is) where the computed logistic pdf value is stored;
 and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = LOGPDF(3)
 LET Y = LOGPDF(X1)

NOTE

The general form of the logistic probability density function is:

$$f(x) = \frac{e^{-\left(\frac{x-\mu}{\sigma}\right)}}{\sigma \left(1 + e^{-\left(\frac{x-\mu}{\sigma}\right)}\right)^2} \quad (\text{EQ 8-264})$$

where μ is a location parameter and σ is a scale parameter. See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating pdf values for the general form of the distribution. The general distribution has a mean of μ and a standard deviation of $\sqrt{\pi^2\sigma^2/3}$. This distribution is symmetric about μ .

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

LOGCDF	=	Compute the logistic cumulative distribution function.
LOGPPF	=	Compute the logistic percent point function.
LOGSF	=	Compute the logistic sparsity function.
NORCDF	=	Compute the normal cumulative distribution function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.
LGNCDF	=	Compute the lognormal cumulative distribution function.
LGNPDF	=	Compute the lognormal probability density function.
LGNPPF	=	Compute the lognormal 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 - 2,” Johnson and Kotz, Houghton-Mifflin, 1970 (chapter 22).
- “Statistical Distributions,” 2nd ed., Evans, Hastings, and Peacock, Wiley and Sons, 1993 (chapter 24).
- “Statistical Models and Methods for Lifetime Data,” Lawless, John Wiley, 1982 (pp. 46-47).

APPLICATIONS

Reliability

IMPLEMENTATION DATE

94/4

PROGRAM

```
YLIMITS 0 0.25
MAJOR YTIC NUMBER 5
MINOR YTIC NUMBER 1
YTIC OFFSET 0 0.02
YTIC DECIMAL 2
XLIMITS -7 7
XTIC OFFSET 0.6 0.6
TITLE AUTOMATIC
PLOT LOGPDF(X) FOR X = -7.5 0.01 7.5
```

