POIPDF

PURPOSE

Compute the Poisson probability density function.

DESCRIPTION

The Poisson distribution is the distribution of the number of events in the interval $(0,\lambda)$ when the waiting time between events is exponentially distributed with mean 1 and standard deviation 1 (there are alternate interpretations as well). The Poisson distribution has the following probability density function:

$$p(x, \lambda) = \frac{e^{-\lambda}\lambda^x}{x!} \qquad \textbf{(EQ 8-304)}$$

where x is a non-negative integer. The mean is λ and the standard deviation is sqrt(λ).

SYNTAX

LET <y2> = POIPDF(<y1>,<lambda>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a non-negative integer variable, number, or parameter (a warning message is printed if it is not);

<y2> is a variable or a parameter (depending on what <y1> is) where the computed Poisson pdf value is stored;

<lambda> is a positive number or parameter that specifies the shape parameter of the Poisson distribution;

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

EXAMPLES

LET A = POIPDF(3,0.5)

LET Y = POIPDF(X1,0.3)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

POICDF	=	Compute the Poisson cumulative distribution function.
POIPPF	=	Compute the Poisson percent point function.
BINCDF	=	Compute the binomial cumulative distribution function.
BINPDF	=	Compute the binomial probability density function.
BINPPF	=	Compute the binomial percent point function.
NBCDF	=	Compute the negative binomial cumulative distribution function.
NBPDF	=	Compute the negative binomial probability density function.
NBPPF	=	Compute the negative binomial percent point function.
GEOCDF	=	Compute the geometric cumulative distribution function.
GEOPDF	=	Compute the geometric probability density function.
GEOPPF	=	Compute the geometric percent point function.

REFERENCE

"Discrete Univariate Distributions," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 4).

"Statistical Distributions," 2nd ed., Evans, Hastings, and Peacock, Wiley and Sons, 1993 (chapter 31).

APPLICATIONS

Queueing theory, analysis of count data

IMPLEMENTATION DATE

94/4

PROGRAM

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MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
YLIMITS 0 0.2
XLIMITS 0 50
XTIC OFFSET 0.5 0.5
LINE BLANK
SPIKE ON
SPIKE THICKNESS 0.3
TITLE AUTOMATIC
X1LABEL NUMBER OF SUCCESSES
Y1LABEL PROBABILITY
TITLE SIZE 3
PLOT POIPDF(X,5) FOR X = 0 1 50
PLOT POIPDF(X,15) FOR X = 0 1 50
PLOT POIPDF(X,25) FOR X = 0 1 50
PLOT POIPDF(X,35) FOR X = 0 1 50
END OF MULTIPLOT
```