GAMCDF

PURPOSE

Compute the standard form of the gamma cumulative distribution function.

DESCRIPTION

The standard form of the gamma cumulative distribution function is:

$$F(x) = \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)} \qquad x \geq 0 \qquad \textbf{(EQ 8-217)}$$

where γ is a positive number that is the shape parameter and Γ and Γ_x are the complete gamma and incomplete gamma functions respectively. The mean and standard deviation of the standard gamma distribution are γ and sqrt(γ) respectively.

SYNTAX

LET <y2> = GAMCDF(<y1>,<gamma>) <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 gamma cdf value is saved;
<gamma> is a number or parameter that specifies the shape parameter;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = GAMCDF(3,1.5)
LET Y = GAMCDF(X1,GAMMA)

NOTE 1

The general form of the gamma cumulative distribution function is:

$$F(x) = \frac{\Gamma_{\frac{x-\mu}{\beta}}(\gamma)}{\Gamma(\gamma)} \qquad x \geq 0 \qquad \textbf{(EQ 8-218)}$$

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.

NOTE 2

If γ is 1, this distribution reduces to the exponential distribution. If γ is a positive integer, the gamma distribution is called the Erlang distribution. The gamma distribution with $\gamma = (\nu/2)$, $\mu = 0$, and $\beta = 2$ where ν is a positive integer is a chi-square distribution with ν degrees of freedom.

DEFAULT

None

SYNONYMS

GAMMAIP

RELATED COMMANDS

GAMPDF	=	Compute the gamma probability density function.
GAMPPF	=	Compute the gamma percent point function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential percent point function.
CHSCDF	=	Compute the chi-square cumulative distribution function.
CHSPDF	=	Compute the chi-square probability density function.
CHSPPF	=	Compute the chi-square percent point function.

REFERENCE

“Continuous Univariate Distributions - 1,” Johnson and Kotz, Houghton Mifflin, 1970 (chapter 17).

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

APPLICATIONS

Data Analysis, Reliability

IMPLEMENTATION DATE

94/4

PROGRAM

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MAJOR YTIC NUMBER 6
MINOR YTIC NUMBER 1
YLIMITS 0 1
YTIC DECIMAL 1
XLIMITS 0 5
XTIC OFFSET 0.6 0.6
SEGMENT 1 COORDINATES 16 88 21 88; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 16 84 21 84; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 16 80 21 80; SEGMENT 3 PATTERN DOT
SEGMENT 4 COORDINATES 16 76 21 76; SEGMENT 4 PATTERN DA2
LEGEND 1 GAMMA = 1; LEGEND 1 COORDINATES 22 87
LEGEND 2 GAMMA = 0.5; LEGEND 2 COORDINATES 22 83
LEGEND 3 GAMMA = 2; LEGEND 3 COORDINATES 22 79
LEGEND 4 GAMMA = 5; LEGEND 4 COORDINATES 22 75
LINES SOLID DASH DOT DASH2
TITLE GAMCDF FOR VARIOUS VALUES OF GAMMA
Y1LABEL PROBABILITY; X1LABEL X
PLOT GAMCDF(X,1) FOR X = 0.01 0.01 5.5 AND
PLOT GAMCDF(X,0.5) FOR X = 0.01 0.01 5.5 AND
PLOT GAMCDF(X,2) FOR X = 0.01 0.01 5.5 AND
PLOT GAMCDF(X,5) FOR X = 0.01 0.01 5.5
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