

GAMMA**PURPOSE**

Compute the gamma function.

DESCRIPTION

The gamma function is defined for a positive real number a as:

$$\Gamma(a) = \int_0^{\infty} x^{a-1} e^{-x} dx \quad (\text{EQ 6-86})$$

SYNTAX

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

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

<y2> is a variable or a parameter (depending on what <y1> is) where the computed gamma values are stored;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = GAMMA(1)

LET X2 = GAMMA(X1)

LET X2 = GAMMA(X1-4)

NOTE 1

For integer values of a , the gamma function reduces to a factorial. Specifically,

$$\Gamma(a) = (a-1)!$$

NOTE 2

The gamma function can overflow even for moderate values of α . The LOGGAMMA function can be used in these cases.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

LOGGAMMA = Compute the log (to base e) gamma function.

GAMMAI = Compute the incomplete gamma function.

BETA = Compute the beta function.

REFERENCE

"Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegun, National Bureau of Standards, 1964 (chapter 6).

"Numerical Recipes: The Art of Scientific Computing (FORTRAN Version)," Press, Flannery, Teukolsky, and Vetterling, Cambridge University Press, 1989 (pages 156-159).

APPLICATIONS

Special functions

IMPLEMENTATION DATE

Pre-1987

PROGRAM

TITLE AUTOMATIC

YLIMITS 0 100

PLOT GAMMA(X) FOR X = 0.01 0.01 6

