

DIGAMMA**PURPOSE**

Compute the digamma (or psi) function.

DESCRIPTION

The digamma function is defined as:

$$\text{digamma}(x) = \frac{\Gamma'(x)}{\Gamma(x)} \quad (\text{EQ Aux-93})$$

where Γ is the gamma function and Γ' is the derivative of the gamma function. This function is undefined for zero and negative integers. Full precision may not be obtained if x is too near a negative integer.

SYNTAX

LET <y> = DIGAMMA(<y>) <SUBSET/EXCEPT/FOR qualification>

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

<y> is a variable or a parameter (depending on what <x> is) where the computed digamma values are stored;

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

EXAMPLES

LET A = DIGAMMA(1)

LET X2 = DIGAMMA(X1)

LET X2 = DIGAMMA(X1-4)

NOTE

DATAPLOT uses the routine DPSI from the SLATEC Common Mathematical Library to compute this function. SLATEC is a large set of high quality, portable, public domain Fortran routines for various mathematical capabilities maintained by seven federal laboratories.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

GAMMA	=	Compute the gamma function.
LOGGAMMA	=	Compute the log (to base e) gamma function.
GAMMAI	=	Compute the incomplete Gamma function.
GAMMAIP	=	Compute an alternate form of the incomplete gamma function.
GAMMAIC	=	Compute the complementary incomplete Gamma function.
GAMMAR	=	Compute the reciprocal gamma function.
TRICOMI	=	Compute Tricomi's 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).

APPLICATIONS

Special Functions

IMPLEMENTATION DATE

94/9

PROGRAM

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TITLE DIGAMMA FUNCTION
XLIMITS -2 10
PLOT DIGAMMA(X) FOR X = 0.1 0.1 10 AND
PLOT DIGAMMA(X) FOR X = -9 0.1 -0.1 AND
PLOT DIGAMMA(X) FOR X = -1.9 0.1 -1.1
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