

**SPENCE****PURPOSE**

Compute the Spence integral.

**DESCRIPTION**

The Spence integral is defined as:

$$F(x) = \int_0^x \frac{-\log(1-y)}{y} dy \quad (\text{EQ Aux-307})$$

This is a form of Spence's integral due to K. Mitchell. It differs from the definition in the NBS Handbook of Mathematical Functions (see the REFERENCE section below).

**SYNTAX**

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

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

<y> is a variable or a parameter (depending on what <x> is where the computed SPENCE integral values are stored; and where the <SUBSET/EXCEPT/FOR qualification> is optional.

**EXAMPLES**

LET A = SPENCE(0.1)

LET A = SPENCE(10)

LET X2 = SPENCE(X)

**NOTE**

DATAPLOT uses the routine DSPENC 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**

LOGINT	=	Compute the logarithmic integral.
EXPINT1	=	Compute the exponential integral of order 1.
EXPINTN	=	Compute the exponential integral of order N.
EXPINTE	=	Compute the principal value of the exponential integral.
ERF	=	Compute the error function.
SININT	=	Compute the sine integral.
COSINT	=	Compute the cosine integral.

**REFERENCE**

"Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegun, National Bureau of Standards, 1964 (page 1004).

Article by K. Mitchell in the Philosophical Magazine, 40, p. 351, (1949).

**APPLICATIONS**

Special Functions

**IMPLEMENTATION DATE**

94/9

PROGRAM

TITLE AUTOMATIC

PLOT SPENCE(X) FOR X = -10 0.01 10

