CAUSF

PURPOSE

Compute the standard Cauchy (i.e, median=0, 75% point at 1) sparsity function.

DESCRIPTION

The standard form of the Cauchy probability density function is:

$$f(x) = \frac{1}{\pi(1 + x^2)} \qquad \textbf{(EQ 8-136)}$$

The standard form of the Cauchy sparsity function is:

$$sf(p) = \frac{\pi}{(\sin(\pi p))^2} \qquad \textbf{(EQ 8-137)}$$

The input value is a real number between 0 and 1.

SYNTAX

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

where \<y1> is a variable, a number, or a parameter in the range 0 to 1;

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

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

EXAMPLES

LET A = CAUSF(0.9)

LET Y = CAUSF(P)

NOTE

The general form of the Cauchy probability density function is:

$$f(x) = \left(\frac{1}{s}\right)\frac{1}{\pi\left(1 + \left(\frac{x - t}{s}\right)^2\right)} \qquad \textbf{(EQ 8-138)}$$

where t and s are the location and scale parameters respectively. The general form of the Cauchy sparsity function is:

$$sf(p) = \frac{s\pi}{(\sin(\pi p))^2} \qquad \textbf{(EQ 8-139)}$$

See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating sparsity function values for the general form of the distribution.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

CAUCDF	=	Compute the Cauchy cumulative distribution function.
CAUPDF	=	Compute the Cauchy probability density function.
CAUPPF	=	Compute the Cauchy percent point function.
NORCDF	=	Compute the normal cumulative distribution function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.
TCDF	=	Compute the T cumulative distribution function.
TPDF	=	Compute the T probability density function.
TPPF	=	Compute the T percent point function.

REFERENCE

"Continuous Univariate Distributions - 1," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 16).

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

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/4

PROGRAM

XLIMITS 0 1
MAJOR XTIC NUMBER 6
MINOR XTIC NUMBER 1
XTIC DECIMAL 1
TITLE AUTOMATIC
PLOT CAUSF(X) FOR X = 0.01 .01 0.99