

SEMCONF**PURPOSE**

Compute the semi-circular cumulative distribution function.

DESCRIPTION

The semi-circular distribution is the distribution of the projection onto one axis of the points uniformly distributed within the unit circle. As such, it is useful for testing 2-dimensional uniformity. The semi-circular probability density function is:

$$f(x) = \sqrt{1-x^2} \quad \text{for } -1 \leq x \leq 1 \quad (\text{EQ 8-311})$$

The semi-circular cumulative distribution function is:

$$F(x) = \frac{1}{2} + \left(\frac{1}{\pi}\right) \left(\arctan\left(\frac{x}{\sqrt{1-x^2}}\right) + x\sqrt{1-x^2} \right) \quad \text{for } -1 \leq x \leq 1 \quad (\text{EQ 8-312})$$

SYNTAX

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

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

<y2> is a variable or a parameter (depending on what <y1> is) where the computed semi-circular cdf value is stored; and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = SEMCONF(3)

LET Y = SEMCONF(X1)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

SEMPDF	=	Compute the semi-circular probability density function.
SEMPPF	=	Compute the semi-circular percent point function.
UNIPDF	=	Compute the uniform probability density function.
UNICDF	=	Compute the uniform cumulative distribution function.
UNIPPF	=	Compute the uniform percent point function.
NORCDF	=	Compute the normal cumulative distributing function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.

REFERENCE

"Continuous Univariate Distributions - 2," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 25).

"Simple and Robust Linear Estimation of the Location Parameter of a Symmetric Distribution," Filliben, unpublished Ph.d dissertation, Princeton University, 1969 (pp. 21-44, 229-231).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/4

PROGRAM

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YLIMITS 0 1
MAJOR YTIC NUMBER 6
MINOR YTIC NUMBER 1
YTIC DECIMAL 1
XLIMITS -1 1
XTIC OFFSET 0.1 0.1
TITLE AUTOMATIC
XILABEL X
YILABEL PROBABILITY
PLOT SEMCDF(X) FOR X = -1 0.01 1
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