LAMCDF

PURPOSE

Compute the Tukey-Lambda cumulative distribution function with shape parameter λ.

DESCRIPTION

The Tukey-Lambda distribution does not have a simple closed form for either the probability density function or the cumulative distribution function. The cumulative distribution function is calculated numerically. Some special cases are:

$\lambda = -1$ -   approximately Cauchy;
$\lambda = 0$ -   exactly logistic;
$\lambda = 0.14$ -   approximately normal;
$\lambda = 0.5$ -   U-shaped;
$\lambda = 1$ -   exactly uniform.

The input value is limited to the range $-1/\lambda <= x <= 1/\lambda$.

SYNTAX

LET \<y2\> = LAMCDF(\<y1\>,\<lambda\>)   \<SUBSET/EXCEPT/FOR qualification\>

where \<y1\> is a variable, a number, or a parameter;
    \<y2\> is a variable or a parameter (depending on what \<y1\> is) where the computed Tukey-Lambda cdf value is saved;
    \<lambda\> is a number or parameter that specifies the shape parameter;
and where the \<SUBSET/EXCEPT/FOR qualification\> is optional.

EXAMPLES

LET A = LAMCDF(3,1)
LET Y = LAMCDF(X1,LAMBDA)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

LAMPDF	=	Compute the Tukey-Lambda probability density function.
LAMPPF	=	Compute the Tukey-Lambda percent point function.
NORPDF	=	Compute the standard normal probability density function.
NORCDF	=	Compute the standard normal cumulative distribution function.
NORPPF	=	Compute the standard normal percent point function.
LOGCDF	=	Compute the logistic cumulative distribution function.
LOGPDF	=	Compute the logistic probability density function.
LOGPPF	=	Compute the logistic percent point function.
UNICDF	=	Compute the uniform cumulative distribution function.
UNIPDF	=	Compute the uniform probability density function.
UNIPPF	=	Compute the uniform percent point function.

REFERENCE

"Low Moments for Small Samples: A Comparative Study of Order Statistics" Hastings, Mosteller, Tukey, and Winsor, Annals of Mathematical Statistics, 18, 1947 (pp. 413-426).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/4

PROGRAM

        MAJOR YTIC NUMBER 6
        MINOR YTIC NUMBER 1
        YLIMITS 0 1
        YTIC DECIMAL 1
        MULTIPLOT 2 3; MULTIPLOT CORNER COORDINATES 0 0 100 100
        LET JUNK = -1
        TITLE AUTOMATIC
        X1LABEL EXACTLY UNIFORM DISTRIBUTION
        XLIMITS -1 1; XTIC OFFSET 0.1 0.1
        PLOT LAMCDF(X,1) FOR X = -1 0.01 1.0
        X1LABEL U SHAPED
        XLIMITS -2 2; XTIC OFFSET 0.2 0.2
        PLOT LAMCDF(X,0.5) FOR X = -1.99 0.01 1.99
        X1LABEL APPROXIMATELY NORMAL
        XLIMITS -3 3; XTIC OFFSET 0.2 0.2
        PLOT LAMCDF(X,0.14) FOR X = -3 .01 3
        X1LABEL EXACTLY LOGISTIC
        XLIMITS -5 5; XTIC OFFSET 0.2 0.2
        PLOT LAMCDF(X,0) FOR X = -5.5 0.01 5.5
        X1LABEL APPROXIMATELY CAUCHY
        XLIMITS -4 4; XTIC OFFSET 0.2 0.2
        PLOT LAMCDF(X,JUNK) FOR X = -4 0.01 4
        X1LABEL
        XLIMITS -0.2 0.2; XTIC OFFSET 0.1 0.1
        PLOT LAMCDF(X,5) FOR X = -0.2 0.001 0.2
        END OF MULTIPLOT