

LAMPDF**PURPOSE**

Compute the Tukey-Lambda probability density function with shape parameter λ .

DESCRIPTION

The Tukey-Lambda distribution does not have a simple closed form formula for the probability density function. It 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 $-1/\lambda \leq x \leq 1/\lambda$.

SYNTAX

LET <y2> = LAMPDF(<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 pdf 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 = LAMPDF(3,1)
```

```
LET Y = LAMPDF(X1,LAMBDA)
```

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

LAMCDF	=	Compute the Tukey-Lambda cumulative distribution 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

```

MULTIPLY 2 3; MULTIPLY 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 LAMPDF(X,1) FOR X = -1 0.01 1.0
X1LABEL U SHAPED
XLIMITS -2 2
XTIC OFFSET 0.2 0.2
PLOT LAMPDF(X,0.5) FOR X = -1.99 0.01 1.99
X1LABEL APPROXIMATELY NORMAL
XLIMITS -3 3
XTIC OFFSET 0.2 0.2
PLOT LAMPDF(X,0.14) FOR X = -3 .01 3
X1LABEL EXACTLY LOGISTIC
XLIMITS -5 5
XTIC OFFSET 0.2 0.2
PLOT LAMPDF(X,0) FOR X = -5.5 0.01 5.5
X1LABEL APPROXIMATELY CAUCHY
XLIMITS -4 4
XTIC OFFSET 0.2 0.2
PLOT LAMPDF(X,JUNK) FOR X = -4 0.01 4
X1LABEL
XLIMITS -0.2 0.2
XTIC OFFSET 0.1 0.1
PLOT LAMPDF(X,5) FOR X = -0.2 0.01 0.2
END OF MULTIPLY

```

