BETPDF

PURPOSE
Compute the beta probability density function with shape parameters α and β.

DESCRIPTION
The beta distribution has the following probability density function:

$$f(x) = \frac{x^{(\alpha-1)}(1-x)^{(\beta-1)}}{BETA(\alpha, \beta)} \qquad 0 < x < 1 \qquad \textbf{(EQ 8-114)}$$

where BETA is the complete beta function (see the documentation for the BETA command for a description of this function) and α and β are positive numbers that define the shape parameters. The input value should be greater than 0 and less than 1.

SYNTAX
LET <y2> = BETPDF(<y1>,<a>,<b>)   <SUBSET/EXCEPT/FOR qualification>
where <y1> is a number, parameter, or variable containing values between 0 and 1;
    <y2> is a variable or a parameter (depending on what <y1> is) where the computed beta pdf value is stored;
    <a> is a number, parameter, or variable that specifies the first shape parameter;
    <b> is a number, parameter, or variable that specifies the second shape parameter;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES
LET A = BETPDF(0.3,10,8)
LET A = BETPDF(A1,10,8)
LET Y = BETPDF(X1,2,6)

NOTE 1
Several other probability functions can be considered special cases of the beta distribution or they can be transformed to a beta distribution. See the books listed in the REFERENCE below for details.

NOTE 2
DATAPLOT calculates the beta pdf value based on the logarithm of the above function. It uses the routine DLBETA from the SLATEC Common Mathematical Library to compute the log beta 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

BETCDF	=	Compute the beta cumulative distribution function.
BETPPF	=	Compute the beta percent point function.
NCBCDF	=	Compute the non-central beta cumulative distribution function.
NCBPPF	=	Compute the non-central beta percent point function.
FCDF	=	Compute the F cumulative distribution function.
FPDF	=	Compute the F probability density function.
FPPF	=	Compute the F percent point function.
GAMCDF	=	Compute the gamma cumulative distribution function.
GAMPDF	=	Compute the gamma probability density function.
GAMPPF	=	Compute the gamma 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

"Continuous Univariate Distributions," Houghton-Mifflin Co., Johnson and Kotz, 1970.

"Statistical Distributions," 2nd Edition, Evans, Hastings, and Peacock, 1970 (chapter 5).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/9

PROGRAM

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TITLE BETPDF FOR VARIOUS VALUES OF A AND B
SEGMENT 1 COORDINATES 64 88 69 88; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 64 84 69 84; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 64 80 69 80; SEGMENT 3 PATTERN DOT
SEGMENT 4 COORDINATES 64 76 69 76; SEGMENT 4 PATTERN DA2
LEGEND 1 A = 2, B = 4; LEGEND 1 COORDINATES 70 87
LEGEND 2 A = 1, B = 1; LEGEND 2 COORDINATES 70 83
LEGEND 3 A = 0.5, B = 0.5; LEGEND 3 COORDINATES 70 79
LEGEND 4 A = 0.2, B = 1; LEGEND 4 COORDINATES 70 75
XLIMITS 0 1
XTIC OFFSET 0.1 0.1
MAJOR XTIC NUMBER 6
MINOR XTIC NUMBER 1
LINES SOLID DASH DOT DASH2
X1LABEL X; Y1LABEL PROBABILITY
PLOT BETPDF(X,2,4) FOR X = 0.01 0.01 0.99 AND
PLOT BETPDF(X,1,1) FOR X = 0.01 0.01 0.99 AND
PLOT BETPDF(X,0.5,0.5) FOR X = 0.01 0.01 0.99 AND
PLOT BETPDF(X,0.2,1) FOR X = 0.01 0.01 0.99
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