BETPPF

PURPOSE

Compute the beta percent point function with shape parameters α and β.

DESCRIPTION

The beta distribution has the following probability density function:

$$f(x) = \frac{x^{(\alpha-1)}(1-x)^{(\beta-1)}}{BETA(\alpha, \beta)} \qquad 0 < x < 1 \qquad \textbf{(EQ 8-115)}$$

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 beta percent point function does not have a simple closed formula, so it is calculated numerically.

SYNTAX

LET <y2> = BETPPF(<p>,<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 ppf 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 = BETPPF(0.9,10,8)

LET Y = BETPPF(X1,10,8)

NOTE

DATAPLOT uses a bisection method to compute the beta ppf value. The algorithm is from the Kennedy and Gentle book (see the REFERENCE section below).

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

BETCDF	=	Compute the beta cumulative distribution function.
BETPDF	=	Compute the beta probability density function.
GAMPPF	=	Compute the gamma percent point function.
NCBCDF	=	Compute the non-central beta cumulative distribution 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.
NCBPPF	=	Compute the non-central beta 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

"Statistical Computing," Kennedy and Gentle, Marcel-Dekker, 1978 (chapter 5).

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

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/9

PROGRAM

```
TITLE BETPPF FOR VARIOUS VALUES OF A AND B
SEGMENT 1 COORDINATES 16 88 21 88; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 16 84 21 84; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 16 80 21 80; SEGMENT 3 PATTERN DOT
SEGMENT 4 COORDINATES 16 76 21 76; SEGMENT 4 PATTERN DA2
LEGEND 1 A = 4, B = 2; LEGEND 1 COORDINATES 22 87
LEGEND 2 A = 1, B = 1; LEGEND 2 COORDINATES 22 83
LEGEND 3 A = 0.5, B=0.5; LEGEND 3 COORDINATES 22 79
LEGEND 4 A = 0.2, B = 1; LEGEND 4 COORDINATES 22 75
LIMITS 0 1
MAJOR TIC NUMBER 6
MINOR TIC NUMBER 1
TIC DECIMAL 1
LINES SOLID DASH DOT DASH2
Y1LABEL X
X1LABEL PROBABILITY
PLOT BETPPF(P,4,2) FOR P = 0.01 .01 0.99 AND
PLOT BETPPF(P,1,1) FOR P = 0.01 .01 0.99 AND
PLOT BETPPF(P,0.5,0.5) FOR P = 0.01 .01 0.99 AND
PLOT BETPPF(P,0.2,1) FOR P = 0.01 .01 0.99
```