BRAPPF

PURPOSE

Compute the Bradford percent point function.

DESCRIPTION

The Bradford probability density function is:

$$f(x, \beta) = \frac{\beta}{\log(1+\beta)(1+\beta x)} \qquad 0 < x < 1, \beta > -1 \qquad \textbf{(EQ Aux-49)}$$

where β is the shape parameter.

The percent point function is the inverse of the cumulative distribution function. The cumulative distribution sums the probability from 0 to the given x value (i.e., the integral of the above function). The percent point function takes a cumulative probability value and computes the corresponding x value. It has the following formula:

$$G(p, \beta) = \frac{e^{p\log(1+\beta)} - 1}{\beta} \qquad 0 < p < 1, \beta > -1 \qquad \textbf{(EQ Aux-50)}$$

The input value is a real number between 0 and 1 (since it corresponds to a probability).

SYNTAX

LET <y> = BRAPPF(<p>,<beta>) <SUBSET/EXCEPT/FOR qualification>

where <p> is a variable, a number, or a parameter in the range 0 to 1;

<y> is a variable or a parameter (depending on what <p> is) where the computed Bradford ppf value is stored;

<beta> is a number, parameter, or variable that specifies the shape parameter;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = BRAPPF(0.9,0.7)

LET X2 = BRAPPF(P,BETA)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

BRACDF	=	Compute the Bradford cumulative distribution function.
BRAPDF	=	Compute the Bradford probability density function.
WARCDF	=	Compute the Waring cumulative distribution function.
WARPDF	=	Compute the Waring probability density function.
WARPPF	=	Compute the Waring percent point function.
PARCDF	=	Compute the Pareto cumulative distribution function.
PARPDF	=	Compute the Pareto probability density function.
PARPPF	=	Compute the Pareto percent point function.
BETCDF	=	Compute the beta cumulative distribution function.
BETPDF	=	Compute the beta probability density function.
BETPPF	=	Compute the beta percent point function.

REFERENCE

"Continuous Univariate Distributions--Vol. 2," 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (page 347).

APPLICATIONS

Approximation to the Zipf or Yule discrete distributions

IMPLEMENTATION DATE

96/2

PROGRAM

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XLIMITS 0 1
MAJOR XTIC MARK NUMBER 6
XTIC OFFSET 0.1 0.1
MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
LET B = -0.5
X1LABEL BETA = ^B
PLOT BRAPPF(P,B) FOR P = 0.01 0.01 0.99
LET B = 0.5
X1LABEL BETA = ^B
PLOT BRAPPF(P,B) FOR P = 0.01 0.01 0.99
LET B = 1.0
X1LABEL BETA = ^B
PLOT BRAPPF(P,B) FOR P = 0.01 0.01 0.99
LET B = 2.0
X1LABEL BETA = ^B
PLOT BRAPPF(P,B) FOR P = 0.01 0.01 0.99
END OF MULTIPLOT
```