GEPPPF

PURPOSE

Compute the standard form for the generalized Pareto percent point function with shape parameter γ.

DESCRIPTION

The standard form of the generalized Pareto percent point function is:

$$G(p) = \left(\frac{1}{\gamma}\right)((1-p)^{-\gamma} - 1) \qquad \textbf{(EQ 8-231)}$$

The shape parameter γ can be any real number. When $\gamma = 0$, the generalized Pareto distribution reduces to an exponential distribution. See the documentation for the EXPPPF command in this chapter for the percent point function of an exponential distribution. The input value should be between 0 and 1.

SYNTAX

LET <y2> = GEPPPF(<y1>,<gamma>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a variable, number, or parameter containing values between 0 and 1;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed generalized Pareto ppf value is stored;

<gamma> is a positive number or parameter that specifies the shape parameter;

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

EXAMPLES

LET A = GEPPPF(0.9,2)

LET Y A = GEPPPF(X1,8)

NOTE 1

The SET MINMAX command is used to specify whether the minimum order statistic or the maximum order statistic form is used. Specifically, SET MINMAX 1 specifies the minimum order statistic while SET MINMAX 2 specifies the maximum order statistic. Currently, only the maximum order statistic form is supported. However, the SET MINMAX command is still required.

NOTE 2

The general form of the generalized Pareto probability density functions is:

$$f(x) = \left(1 + \frac{\gamma x}{\beta}\right)^{\left(-\left(\frac{\beta}{\gamma}\right)-1\right)} \qquad \text{for } 1+\gamma\frac{x}{\beta},\ \gamma \neq 0 \qquad \textbf{(EQ 8-232)}$$

The parameter β is a scale parameter. See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating pdf values for the general form of the distribution.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

GEPCDF	=	Compute the generalized Pareto cumulative distribution function.
GEPPDF	=	Compute the generalized Pareto probability density function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential percent point function.
EV1PDF	=	Compute the extreme value type I probability density function.
EV1PPF	=	Compute the extreme value type I percent point function.
EV2PDF	=	Compute the extreme value type II probability density function.
EV2PPF	=	Compute the extreme value type II percent point function.
WEIPPF	=	Compute the Weibull percent point function.

REFERENCE

"Continuous Univariate Distributions - 1," 2nd ed., Johnson and Kotz, 1994 (chapter 19).

"Computing Maximum Likelihood Estimates for the Generalized Pareto Distribution," Grimshaw, Technometrics, May, 1993.

APPLICATIONS

Extreme Value Analysis

IMPLEMENTATION DATE

94/2

PROGRAM

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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 GAMMA = 1; LEGEND 1 COORDINATES 22 87
LEGEND 2 GAMMA = 2; LEGEND 2 COORDINATES 22 83
LEGEND 3 GAMMA = 5; LEGEND 3 COORDINATES 22 79
LEGEND 4 GAMMA = 0.5; LEGEND 4 COORDINATES 22 75
SET MINMAX 2
XLIMITS 0 1; XTIC DECIMAL 1
MAJOR XTIC NUMBER 6; MINOR XTIC NUMBER 1
LINES SOLID DASH DOT DASH2
TITLE GEPPPF FOR VARIOUS VALUES OF GAMMA
X1LABEL PROBABILITY; Y1LABEL X
YLIMITS 0 10; MAJOR YTIC MARK NUMBER 6; YTIC OFFSET 0 0.3
PLOT GEPPPF(X,1) FOR X = 0.0 1 .01 0.99 AND
PLOT GEPPPF(X,2) FOR X = 0.01 .01 0.99 AND
PLOT GEPPPF(X,5) FOR X = 0.01 .01 0.99 AND
PLOT GEPPPF(X,0.5) FOR X = 0.01 .01 0.99
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