GEVPPF

PURPOSE

Compute the standard form of the generalized extreme value percent point function with shape parameter γ.

DESCRIPTION

For positive γ, the standard form of the generalized extreme value probability density function is:

$$f(x) = e^{-[1-\gamma x]^{1/\gamma}[1-\gamma x]^{\frac{1}{\gamma}-1}} \qquad -\infty < x < \frac{1}{\gamma} \qquad \textbf{(EQ Aux-161)}$$

For negative γ, the standard form of the generalized extreme value probability density function is:

$$f(x) = e^{-[1-\gamma x]^{1/\gamma}[1-\gamma x]^{\frac{1}{\gamma}-1}} \qquad \frac{1}{\gamma} < x < \infty \qquad \textbf{(EQ Aux-162)}$$

For zero γ, the standard form of the generalized extreme value probability density function is:

$$f(x) = e^{-e^{-x}e^{-x}} \qquad -\infty < x < \infty \qquad \textbf{(EQ Aux-163)}$$

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.

For zero γ, the standard form of the generalized extreme value percent point function is:

$$G(p) = -\log\left(\log\left(\frac{1}{p}\right)\right) \qquad \textbf{(EQ Aux-164)}$$

For non-zero γ, the standard form of the generalized extreme value percent point function is:

$$G(p) = \frac{1-\log(p)^{\gamma}}{\gamma} \qquad \textbf{(EQ Aux-165)}$$

SYNTAX

LET <y> = GEVPPF(<p>,<gamma>) <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 <x> is) where the computed generalized extreme value ppf value is saved;

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

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

EXAMPLES

LET A = GEVPPF(0.9,3)

LET X2 = GEVPPF(P,G1)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

GEVCDF	=	Compute the generalized extreme value cumulative distribution function.
GEVPDF	=	Compute the generalized extreme value probability density function.
EV2CDF	=	Compute the extreme value type II cumulative distribution function.
EV2PDF	=	Compute the extreme value type II probability density function.
EV2PPF	=	Compute the extreme value type I percent point function.
EV1CDF	=	Compute the extreme value type I cumulative distribution function.
EV1PDF	=	Compute the extreme value type I probability density function.

EV1PPF	=	Compute the extreme value type I percent point function.
EV2PPF	=	Compute the extreme value type II percent point function.
WEICDF	=	Compute the Weibull cumulative distribution function.
WEIPDF	=	Compute the Weibull probability density function.
WEIPPF	=	Compute the Weibull percent point function.

REFERENCE

"Continuous Univariate Distributions - Volume 2," 2nd. Ed., Johnson, Kotz, and Balakrishnan, Wiley and Sons, 1994 (pp. 75-76).

APPLICATIONS

Extreme Value Analysis, Reliability

IMPLEMENTATION DATE

95/9

PROGRAM

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MULTIPLOT 3 3; MULTIPLOT CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
.
LET GAMMA = DATA 0.0 0.5 -0.5 1.0 -1.0 2.0 -2.0 5.0 -5.0
.
LOOP FOR K = 1 1 9
    LET G = GAMMA(K)
    X1LABEL GAMMA = ^G
    PLOT GEVPPF(P,G) FOR P = 0.01 0.01 0.95
END OF LOOP
END OF MULTIPLOT
```