GEVCDF

PURPOSE
Compute the standard form of the generalized extreme value cumulative distribution function with shape parameter gamma.

DESCRIPTION
For positive γ, the standard form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-[1-\gamma x]^{1/\gamma}{}'''} \qquad -\infty < x \le \frac{1}{\gamma} \qquad \textbf{(EQ Aux-149)}$$

For negative γ, the standard form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-[1-\gamma x]^{1/\gamma}} \qquad \frac{1}{\gamma} \le x < \infty \qquad \textbf{(EQ Aux-150)}$$

For zero γ, the standard form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-e^x} \qquad -\infty < x < \infty \qquad \textbf{(EQ Aux-151)}$$

SYNTAX
LET <y> = GEVCDF(<x>,<gamma>)   <SUBSET/EXCEPT/FOR qualification>
where <x> is a variable, a number, or a parameter;
> <y> is a variable or a parameter (depending on what <x> is) where the computed generalized extreme value pdf 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 = GEVCDF(3,1.5)
LET X2 = GEVCDF(X1,GAMMA)

NOTE
For positive γ, the general form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-\left[1-\gamma\left(\frac{x-\mu}{\sigma}\right)\right]^{1/\gamma}}{}''' \qquad -\infty < x \le \mu + \frac{\sigma}{\gamma} \qquad \textbf{(EQ Aux-152)}$$

For negative γ, the general form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-\left[1-\gamma\left(\frac{x-\mu}{\sigma}\right)\right]^{1/\gamma}} \qquad \mu + \frac{\sigma}{\gamma} \le x < \infty \qquad \textbf{(EQ Aux-153)}$$

For zero γ, the general form of the generalized extreme value cumulative distribution function is:

$$F(x) = e^{-e^{\frac{x-\mu}{\sigma}}} \qquad -\infty < x < \infty \qquad \textbf{(EQ Aux-154)}$$

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS

GEVPDF	=	Compute the generalized extreme value probability density function.
GEVPPF	=	Compute the generalized extreme value percent point 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
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
LET START = DATA -5 -4   -1.99 -3   -0.99 -3   -0.49 -3   -0.19
LET STOP = DATA 5 1.99 4   0.99 3   0.49 3   0.19 3
.
LOOP FOR K = 1 1 9
      LET G = GAMMA(K); X1LABEL GAMMA = ^G
      LET A1 = START(K); LET A2 = STOP(K)
      PLOT GEVCDF(X,G) FOR X = A1 0.01 A2
END OF LOOP
END OF MULTIPLOT