WEIPPF

PURPOSE

Compute the 1 parameter Weibull percent point function with tail length parameter γ.

DESCRIPTION

For the minimum order statistic, the standard form of the Weibull percent point function is:

$$G(p) = (-\log(1-p))^{1/\gamma} \quad \textbf{(EQ 8-362)}$$

For the maximum order statistic, the standard form of the Weibull percent point function is:

$$G(p) = (-\log(1-p))^{1/\gamma} \quad \textbf{(EQ 8-363)}$$

where γ is a positive shape parameter.

SYNTAX

LET <y2> = WEIPPF(<y1>,<gamma>) <SUBSET/EXCEPT/FOR qualification>
where <y1> is a variable, a number, or a parameter containing values between 0 and 1;
<y2> is a variable or a parameter (depending on what <y1> is) where the computed Weibull ppf value is stored;
<gamma> is a positive number or parameter that specifies the tail length parameter;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

LET A = WEIPPF(0.9,2)
LET Y = WEIPPF(P,4)

NOTE 1

The SET MINMAX command specifies whether the minimum or the maximum order statistic form is used. Entering SET MINMAX 2 specifies the maximum order statistic while SET MINMAX 1 specifies the minimum order statistic.

NOTE 2

For the minimum order statistic, the general of the Weibull percent point function is:

$$G(p) = \alpha(-\log(1-p))^{1/\gamma} \quad \textbf{(EQ 8-364)}$$

For the maximum order statistic, the general form of the Weibull percent point function is:

$$G(p) = \alpha(-\log(1-p))^{1/\gamma} \quad \textbf{(EQ 8-365)}$$

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

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

WEIPDF	=	Compute the Weibull probability density function.
WEIPPF	=	Compute the Weibull percent point function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential 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.

REFERENCE

"Continuous Univariate Distributions - 1," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 20).

"Statistical Distributions," 2nd Ed., Evans, Hastings, and Peacock, Wiley and Sons, 1993 (chapter 41).

APPLICATIONS

Reliability Analysis

IMPLEMENTATION DATE

Pre-1987 (the SET MINMAX capability was implemented 93/7, earlier versions supported the minimum order statistic only)

PROGRAM

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TITLE WEIPPF FOR VARIOUS VALUES OF GAMMA
Y1LABEL X; X1LABEL PROBABILITY
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
XLIMITS 0 1; MAJOR XTIC NUMBER 6
MINOR XTIC NUMBER 1; XTIC DECIMAL 1
LINES SOLID DASH DOT DASH2
YLIMITS 0 5; MAJOR YTIC MARK NUMBER 6; YTIC OFFSET 0 0.3
SET MINMAX 1
PLOT WEIPPF(X,1) FOR X = 0.01 .01 0.99 AND
PLOT WEIPPF(X,2) FOR X = 0.01 .01 0.99 AND
PLOT WEIPPF(X,5) FOR X = 0.01 .01 0.99 AND
PLOT WEIPPF(X,0.5) FOR X = 0.01 .01 0.90
```