

EV2CDF**PURPOSE**

Compute the standard form of the extreme value type II (also known as the Frechet distribution) cumulative distribution function.

DESCRIPTION

For the minimum order statistic, the standard form of the extreme value type II cumulative distribution function is:

$$F(x) = 1 - e^{-((-x)^{-\gamma})} \quad \text{for } x \leq 0 \quad \text{(EQ 8-181)}$$

For the maximum order statistic, the standard form of the extreme value type II cumulative distribution function is:

$$F(x) = e^{-(x^{-\gamma})} \quad \text{for } x \geq 0 \quad \text{(EQ 8-182)}$$

where γ is a positive number that is the shape parameter.

SYNTAX

LET <y2> = EV2CDF(<y1>,<gamma>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a variable, a number, or a parameter;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed extreme value type II cdf value is saved;

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

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

EXAMPLES

LET A = EV2CDF(3,1.5)

LET Y = EV2CDF(X1,GAMMA)

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 form of the extreme value type II cumulative distribution function is:

$$F(x) = 1 - e^{-\left(\frac{-x-\mu}{\beta}\right)^{-\gamma}} \quad \text{for } x \leq \mu \quad \text{(EQ 8-183)}$$

For the maximum order statistic, the general form of the extreme value type II cumulative distribution function is:

$$F(x) = e^{-\left(\frac{x-\mu}{\beta}\right)^{-\gamma}} \quad \text{for } x \geq \mu \quad \text{(EQ 8-184)}$$

The parameter μ is a location parameter and the parameter β is a scale parameter that must be greater than 0. See topic (3) under the General considerations section at the beginning of this chapter for a discussion of generating cdf values for the general form of the distribution.

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

| | | |
|--------|---|--|
| EV2PDF | = | Compute the extreme value type II probability density function. |
| EV2PPF | = | Compute the extreme value type II 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. |
| WEICDF | = | Compute the Weibull cumulative distribution function. |

WEIPDF = Compute the Weibull probability density function.

REFERENCE

"Methods for Statistical Analysis of Reliability and Life Data," Mann, Schaffer, and Singpurwalla, Wiley, 1974 (pp. 102-111).

APPLICATIONS

Extreme Value Analysis

IMPLEMENTATION DATE

94/4

PROGRAM

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SET MINMAX 2
MAJOR YTIC NUMBER 6; MINOR YTIC NUMBER 1
YLIMITS 0 1; YTIC DECIMAL 1; XLIMITS 0 5; XTIC OFFSET 0.6 0.6
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 = 0.5; LEGEND 2 COORDINATES 22 83
LEGEND 3 GAMMA = 2; LEGEND 3 COORDINATES 22 79
LEGEND 4 GAMMA = 5; LEGEND 4 COORDINATES 22 75
LINES SOLID DASH DOT DASH2
TITLE EV2CDF FOR VARIOUS VALUES OF GAMMA
X1LABEL X; Y1LABEL PROBABILITY
PLOT EV2CDF(X,1) FOR X = 0.01 0.01 5.5 AND
PLOT EV2CDF(X,0.5) FOR X = 0.01 0.01 5.5 AND
PLOT EV2CDF(X,2) FOR X = 0.01 0.01 5.5 AND
PLOT EV2CDF(X,5) FOR X = 0.01 0.01 5.5

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