

EV2PDF**PURPOSE**

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

DESCRIPTION

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

$$f(x) = \gamma(-x)^{(-\gamma-1)}e^{-(-x^{-\gamma})} \quad \text{for } x \leq 0 \quad \text{(EQ 8-185)}$$

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

$$f(x) = \gamma x^{(-\gamma-1)}e^{-(x^{-\gamma})} \quad \text{for } x \geq 0 \quad \text{(EQ 8-186)}$$

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

SYNTAX

LET <y2> = EV2PDF(<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 pdf 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 = EV2PDF(3,1.5)

LET Y = EV2PDF(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 probability density function is:

$$f(x) = \gamma \left(\frac{-x-\mu}{\beta} \right)^{(-\gamma-1)} e^{-\left(\frac{-x-\mu}{\beta} \right)^{\gamma}} \quad \text{for } x \leq \mu \quad \text{(EQ 8-187)}$$

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

$$f(x) = \gamma \left(\frac{x-\mu}{\beta} \right)^{(-\gamma-1)} e^{-\left(\frac{x-\mu}{\beta} \right)^{\gamma}} \quad \text{for } x \geq \mu \quad \text{(EQ 8-188)}$$

The parameter μ is a location parameter and 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

EV2CDF	=	Compute the extreme value type II cumulative distribution 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
TITLE EV2PDF FOR VARIOUS VALUES OF GAMMA
X1LABEL X; Y1LABEL PROBABILITY
LINES SOLID DASH DOT DASH2
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 71 88 76 88; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 71 84 76 84; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 71 80 76 80; SEGMENT 3 PATTERN DOT
LEGEND 1 GAMMA = 1; LEGEND 1 COORDINATES 77 87
LEGEND 2 GAMMA = 0.5; LEGEND 2 COORDINATES 77 83
LEGEND 3 GAMMA = 2; LEGEND 3 COORDINATES 77 79
PLOT EV2PDF(X,1) FOR X = 0.01 0.01 5.5 AND
PLOT EV2PDF(X,0.5) FOR X = 0.01 0.01 5.5 AND
PLOT EV2PDF(X,2) FOR X = 0.01 0.01 5.5
  
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