

**DWEPDF****PURPOSE**

Compute the standard form of the double Weibull probability density function with tail length parameter  $\gamma$ .

**DESCRIPTION**

The standard form of the double Weibull probability density function is:

$$f(x, \gamma) = \left(\frac{\gamma}{2}\right) |x|^{\gamma-1} e^{-|x|^\gamma} \quad (\text{EQ Aux-104})$$

for any real  $x$  where  $\gamma$  is the positive tail length parameter.

This is simply the Weibull distribution reflected about  $x = 0$  when  $x$  is negative. For the Weibull distribution, DATAPLOT makes a distinction between the Weibull distribution based on the minimum order statistic and the Weibull distribution based on the maximum order statistic. However, the double Weibull distribution has the same formula in either case.

**SYNTAX**

LET <y> = DWEPDF(<x>, GAMMA) <SUBSET/EXCEPT/FOR qualification>

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

<y> is a variable or a parameter (depending on what <x> is) where the computed double Weibull pdf 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 = DWEPDF(3,2)

LET A = DWEPDF(A1,4)

**NOTE**

The general form of the double Weibull probability density function is:

$$f(x, \gamma, \mu, \alpha) = \left(\frac{\gamma}{2\alpha}\right) \left|\frac{x-\mu}{\alpha}\right|^{\gamma-1} e^{-\left|\frac{x-\mu}{\alpha}\right|^\gamma} \quad (\text{EQ Aux-105})$$

for any real  $x$  where  $\mu$  is a location parameter and  $\alpha$  is a positive scale parameter.

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

DWECDF	=	Compute the double Weibull cumulative distribution function.
DWEPPF	=	Compute the double Weibull percent point function.
WEICDF	=	Compute the Weibull cumulative distribution function.
WEIPDF	=	Compute the Weibull probability density function.
WEIPPF	=	Compute the Weibull percent point function.
DEXCDF	=	Compute the double exponential cumulative distribution function.
DEXPDF	=	Compute the double exponential probability density function.
DEXPPF	=	Compute the double exponential percent point function.

**REFERENCE**

"Continuous Univariate Distributions - Vol. 1," 2nd. ed., Johnson, Kotz, and Balakrishnan, 1994 (page 688).

**APPLICATIONS**

Reliability Analysis

## IMPLEMENTATION DATE

95/9

## PROGRAM

```
TITLE DWEPDF FOR X = -3 0.01 3
XILABEL X
YILABEL PROBABILITY
LET G = DATA 1 2 5 0.5
LEGEND 1 COORDINATES 75 87
MULTILOT 2 2; MULTILOT CORNER COORDINATES 0 0 100 100
LOOP FOR K = 1 1 4
  LET GAMMA = G(K)
  LEGEND 1 GAMMA = ^GAMMA
  PLOT DWEPDF(X,GAMMA) FOR X = -3.0 0.01 3
END OF LOOP
END OF MULTILOT
```

