EWEPDF

PURPOSE
Compute the standard form of the exponentiated-Weibull probability density function with shape parameters γ and θ.

DESCRIPTION
The standard form of the exponentiated Weibull probability density function is:

$$f(x, \gamma, \theta, \sigma) = (\gamma\theta)[1 - e^{-x^\gamma}]^{\theta-1} e^{-x^\gamma} x^{\gamma-1} \qquad 0 < x < \infty \qquad \textbf{(EQ Aux-124)}$$

where γ and θ are positive shape parameters.

SYNTAX
LET <y> = EWEPDF(<x>,<gamma>,<theta>)   <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 exponentiated Weibull pdf value is stored;
    <gamma> is a positive number, parameter, or variable that specifies the first shape parameter;
    <theta> is a positive number, parameter, or variable that specifies the second shape parameter;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES
LET A = EWEPDF(3,2,0.5)
LET A = EWEPDF(X,G,T)

NOTE 1
The Weibull distribution can be based on either the minimum order statistic (SET MINMAX = 1) or the maximum order statistic (SET MINMAX = 2). Currently, the exponentiated Weibull distribution is only supported for the minimum order statistic case.

NOTE 2
The general form of the exponentiated Weibull probability density function is:

$$f(x, \gamma, \theta, \sigma) = \frac{\gamma\theta}{\sigma}\left[1 - e^{-\left(\frac{x}{\sigma}\right)^\gamma}\right]^{\theta-1} e^{-\left(\frac{x}{\sigma}\right)^\gamma}\left(\frac{x}{\sigma}\right)^{\gamma-1} \qquad 0 < x < \infty \qquad \textbf{(EQ Aux-125)}$$

where γ and θ are positive shape parameters and σ is a scale parameter.

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS
EWECDF	=	Compute the exponentiated Weibull cumulative distribution function.
EWEPPF	=	Compute the exponentiated 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.

REFERENCE
"The Exponentiated Weibull Family: A Reanalysis of the Bus-Motor- Failure Data," Mudholkar, Srivastava, and Freimer, Technometrics, November, 1995 (pp. 436-445).

APPLICATIONS
Reliability Analysis

IMPLEMENTATION DATE
95/9

PROGRAM
```
     LET G = DATA 1 1 1 0.5 0.5 0.5 2 2 2
     LET C = DATA 0.5 1 2 0.5 1 2 0.5 1 2
     LET START = DATA 0.01 0 0 0.01 0.01 0 0 0 0
     LET INC = DATA 0.001 0.01 0.01 0.001 0.01 0.01 0.01 0.01 0.01
     LET STOP = DATA 0.5 5 5 1 5 5 5 5 5
     .
     MULTIPLOT 3 3; MULTIPLOT CORNER COORDINATES 0 0 100 100
     TITLE AUTOMATIC
     LOOP FOR K = 1 1 9
          LET G1 = G(K)
          LET C1 = C(K)
          LET FIRST = START(K)
          LET LAST = STOP(K)
          LET INCT = INC(K)
          X1LABEL GAMMA = ^G1
          X2LABEL THETA = ^C1
          PLOT EWEPDF(X,G1,C1) FOR X = FIRST INCT LAST
     END OF LOOP
     END OF MULTIPLOT
```