

**POWCDF****PURPOSE**

Compute the standard form of the power function cumulative distribution function.

**DESCRIPTION**

The standard form of the probability density function is:

$$f(x, c) = cx^{c-1} \quad 0 \leq x \leq 1 \quad \text{(EQ Aux-284)}$$

where  $c$  is a shape parameter. The cumulative distribution is the area under the curve from 0 to  $x$  (i.e., the integral of the above function). It has the formula:

$$F(x, c) = x^c \quad 0 \leq x \leq 1 \quad \text{(EQ Aux-285)}$$

The power function distribution is also the distribution of the inverse of a Pareto distribution.

**SYNTAX**

LET <y2> = POWCDF(<y1>, <c>) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a number, parameter, or variable in the range 0 to 1;

<c> is a number, parameter, or variable that specifies the shape parameter;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed power function pdf value is saved; and where the <SUBSET/EXCEPT/FOR qualification> is optional.

**EXAMPLES**

LET A = POWCDF(3,1.5)

LET X2 = POWCDF(X1,C)

**NOTE**

The general form of the probability density function is:

$$f(x, c, b) = \frac{cx^{c-1}}{b^c} \quad 0 \leq x \leq 1 \quad \text{(EQ Aux-286)}$$

where  $b$  is a positive scale parameter. The formula for the general form of the cumulative distribution function is:

$$F(x, c, b) = \left(\frac{x}{b}\right)^c \quad 0 \leq x \leq 1 \quad \text{(EQ Aux-287)}$$

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

POWPDF	=	Compute the power function probability density function.
POWPPF	=	Compute the power function percent point function.
PARCDF	=	Compute the Pareto cumulative distribution function.
PARPDF	=	Compute the Pareto probability density function.
PARPPF	=	Compute the Pareto percent point function.
GEPCDF	=	Compute the generalized Pareto cumulative distribution function.
GEPPDF	=	Compute the generalized Pareto probability density function.
GEPPPF	=	Compute the generalized Pareto percent point function.
EXPCDF	=	Compute the exponential cumulative distribution function.
EXPPDF	=	Compute the exponential probability density function.
EXPPPF	=	Compute the exponential percent point function.

## REFERENCE

“Continuous Univariate Distributions,” 2nd ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (page 607).

“Statistical Distributions,” 2nd ed., Evans, Hastings, and Peacock, John Wiley & Sons, 1993.

## APPLICATIONS

Data Analysis

## IMPLEMENTATION DATE

95/4

## PROGRAM

TITLE POWER FUNCTION CDF'S (0.1, 0.5, 1, 3, 10)

PLOT POWCDF(X,0.1) FOR X = 0.01 0.01 1 AND

PLOT POWCDF(X,0.5) FOR X = 0.01 0.01 1 AND

PLOT POWCDF(X,1) FOR X = 0.01 0.01 1 AND

PLOT POWCDF(X,3) FOR X = 0.01 0.01 1 AND

PLOT POWCDF(X,10) FOR X = 0.01 0.01 1

