DLGCDF

PURPOSE

Compute the discrete logarithmic series cumulative distribution function.

DESCRIPTION

The discrete logarithmic distribution has the following probability density function:

$$p(x, \theta) \equiv \frac{-\theta^x}{\log(1-c)x} \qquad x = 1, 2, ... \qquad \textbf{(EQ Aux-94)}$$

where θ is a shape parameter in the interval (0,1). The cumulative distribution is the probability of obtaining x or fewer events. It is the sum of the logarithmic series probabilities of 0 to x.

SYNTAX

LET <y2> = DLGCDF(<y1>,<theta>)   <SUBSET/EXCEPT/FOR qualification>

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

   <y2> is a variable or a parameter (depending on what <y1> is) where the computed logarithmic series cdf value is stored;

   <theta> is a number, parameter, or variable in the range (0,1) that specifies the shape parameter;

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

EXAMPLES

LET A = DLGCDF(3,0.5)

LET X2 = DLGCDF(X1,0.3)

NOTE

The cumulative distribution function is computed from the following recurrence relation given in Johnson, Kotz, and Kemp (see the Reference section below):

$$p(X=x+1) = \frac{\theta x\ p(X=x)}{x+1} \qquad x = 1, 2, ... \qquad \textbf{(EQ Aux-95)}$$

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

DLGPDF	=	Compute the logarithmic series probability density function.
DLGPPF	=	Compute the logarithmic series percent point function.
WARCDF	=	Compute the Waring cumulative distribution function.
WARPDF	=	Compute the Waring probability density function.
WARPPF	=	Compute the Waring percent point function.
POICDF	=	Compute the Poisson cumulative distribution function.
POIPDF	=	Compute the Poisson probability density function.
POIPPF	=	Compute the Poisson percent point function.
BINCDF	=	Compute the binomial cumulative distribution function.
BINPDF	=	Compute the binomial probability density function.
BINPPF	=	Compute the binomial percent point function.
NBCDF	=	Compute the negative binomial cumulative distribution function.
NBPDF	=	Compute the negative binomial probability density function.
NBPPF	=	Compute the negative binomial percent point function.
GEOCDF	=	Compute the geometric cumulative distribution function.
GEOPDF	=	Compute the geometric probability density function.
GEOPPF	=	Compute the geometric percent point function.

REFERENCE

"Discrete Univariate Distributions," 2nd. ed., Johnson, Kotz, and Kemp, John Wiley & Sons, 1994 (chapter 7).

"Statistical Distributions," 2nd. ed., Evans, Hastings, and Peacock, John Wiley and Sons, 1993 (chapter 23).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

95/4

PROGRAM

```
LET Z = DATA ...
     0.1 0.3 0.5 0.7 0.8 0.85 0.90 0.95 0.99 0.995 0.999 0.9999
TITLE AUTOMATIC
XTIC OFFSET 0.5 0.5
SPIKE ON
LINE BLANK
MULTIPLOT CORNER COORDINATES 0 0 100 100
MULTIPLOT 4 3
LOOP FOR K = 1 1 12
     LET THETA = Z(K)
     X1LABEL THETA = ^THETA
     PLOT DLGCDF(X,THETA) FOR X = 1 1 50
END OF LOOP
END OF MULTIPLOT
```