KAPCDF

PURPOSE

Compute Mielke's beta-kappa cumulative distribution function.

DESCRIPTION

Mielke's beta-kappa distribution has the following probability density function:

$$f(x, \kappa, \beta, \theta) = \frac{\kappa}{\beta} \frac{\left(\frac{x}{\beta}\right)^{\kappa - 1}}{\left(1 + \left(\frac{x}{\beta}\right)^{\theta}\right)^{1 + \frac{\kappa}{\theta}}} \qquad x > 0 \qquad \textbf{(EQ Aux-210)}$$

(EQ Aux-211)

where κ, β, and θ are shape parameters. The cumulative distribution function has the formula:

$$F(x, \kappa, \beta, \theta) = \left(\frac{\left(\frac{x}{\beta}\right)^{\theta}}{1 + \left(\frac{x}{\beta}\right)^{\theta}} \right)^{\kappa / \theta} \qquad x > 0 \qquad \textbf{(EQ Aux-212)}$$

Mielke's beta-kappa distribution is a special case of a reparameterized generalized F distribution of the form a*(F(v1,v2)**b). The details of the reparameterization are given in the Johnson, Kotz, and Balakrishnan book (see the Reference sections below). This reference also discusses several forms of generalized F distributions.

SYNTAX

LET <y> = KAPCDF(<x>,<k>,<beta>,<theta>) <SUBSET/EXCEPT/FOR qualification>

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

<y> is a variable or a parameter (depending on what <x> is) where the computed Mielke's beta-kappa cdf value is saved;

<k> is a number or parameter that specifies the first shape parameter;

<beta> is a number or parameter that specifies the second shape parameter;

<theta> is a number or parameter that specifies the third shape parameter;

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

EXAMPLES

LET A = KAPCDF(3,0.5,2,1.5)

LET X2 = KAPCDF(X1,K,BETA,THETA)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

KAPPDF	=	Compute the Mielke's beta-kappa cumulative distribution function.
KAPPPF	=	Compute the Mielke's beta-kappa percent point function.
BETCDF	=	Compute the beta cumulative distribution function.
BETPDF	=	Compute the beta probability density function.
BETPPF	=	Compute the beta percent point function.
FCDF	=	Compute the F cumulative distribution function.
FPDF	=	Compute the F probability density function.
FPPF	=	Compute the F percent point function.

REFERENCE

"Continuous Univariate Distributions - Vol. 2," 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (pp. 348-351).

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

96/1

PROGRAM

```
LET KP = DATA 1 1 1 0.5 0.5 0.5 2 2 2
LET BP = DATA 0.5 1 2 0.5 1 2 0.5 1 2
LET TP = DATA 0.5 1 2 0.5 1 2 0.5 1 2
.
TITLE AUTOMATIC
TIC LABEL SIZE 3
LABEL SIZE 3
.
MULTIPLOT 3 3; MULTIPLOT CORNER COORDINATES 0 0 100 100
LOOP FOR LL = 1 1 9
    LET K = KP(LL)
    LET B = BP(LL)
    LET T = TP(LL)
    X1LABEL K = ^K, BETA = ^B, THETA = ^T
    PLOT KAPCDF(X,K,B,T) FOR X = 0.01 0.01 5
END OF LOOP
END OF MULTIPLOT
```