**HFLCDF**

**PURPOSE**

Compute the half-logistic or the generalized half-logistic cumulative distribution function.

**DESCRIPTION**

The half-logistic distribution has the following probability density function:

\[
f(x) = \frac{2e^{-x}}{(1 + e^{-x})^2} \quad x \geq 0
\]  

(EQ Aux-197)

The generalized form of this distribution has the probability density function:

\[
f(x, k) = \frac{2\left(1 - kx^{1/k}\right)}{(1 + (1 - kx^{1/k}))^2} \quad 0 \leq x \leq \frac{1}{k}, \; k > 0
\]  

(EQ Aux-198)

The corresponding cumulative distribution functions are:

\[
F(x) = \frac{1 - e^{-x}}{1 + e^{-x}} \quad x \geq 0
\]  

(EQ Aux-199)

and

\[
F(x, k) = \frac{1 - (1 - kx^{1/k})}{1 + (1 - kx^{1/k})} \quad 0 \leq x \leq \frac{1}{k}, \; k > 0
\]  

(EQ Aux-200)

The half-logistic distribution is formed by folding the standard logistic distribution (that is, the distribution of ABS(x) where x has a logistic distribution).

**SYNTAX**

\[
\text{LET } y = \text{HFLCDF}(x, k) \; <\text{SUBSET/EXCEPT/FOR qualification>}
\]

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

<k> is an optional number, parameter, or variable that specifies the shape parameter;

<y> is a variable or a parameter (depending on what <x> is) where the computed half-logistic cdf value is stored;

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

If the <k> parameter is omitted, the half-logistic cdf is computed. If <k> is given, the generalized half-logistic cdf is computed.

**EXAMPLES**

LET A = HFLCDF(3)
LET A = HFLCDF(0.8,0.4)
LET X2 = HFLCDF(X1)
LET X2 = HFLCDF(X1,K)

**NOTE**

DATAPLOT limits the value of the shape parameter to values less than or equal to 10.

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

- **HFLPDF** = Compute the generalized half-logistic probability density function.
- **HFLPPF** = Compute the generalized half-logistic percent point function.
- **LOGCDF** = Compute the logistic cumulative distribution function.
- **LOGPDF** = Compute the logistic probability density function.
HFLCDF

LOGPPF = Compute the logistic percent point function.
LLGCDF = Compute the log-logistic cumulative distribution function.
LLGPDF = Compute the log-logistic probability density function.
LLGPPF = Compute the log-logistic percent point function.

REFERENCE

APPLICATIONS
Lifetime Analysis

IMPLEMENTATION DATE
95/10

PROGRAM
MULTIPLATFORM 2 2; MULTIPLATFORM CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
X1LABEL HALF LOGISTIC DISTRIBUTION
PLOT HFLCDF(X) FOR X = 0 0.01 5
LET K = 0.5
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
LET UL = 1/K; PLOT HFLCDF(X,K) FOR X = 0 0.01 UL
LET K = 1
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
LET UL = 1/K; PLOT HFLCDF(X,K) FOR X = 0 0.01 UL
LET K = 2
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
LET UL = 1/K; PLOT HFLCDF(X,K) FOR X = 0 0.01 UL
END OF MULTIPLATFORM