# HFLPPF

## PURPOSE
Compute the half-logistic or generalized half-logistic percent point function.

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

$$f(x) = \frac{2e^{-x}}{(1 + e^{-x})^2} \qquad x \geq 0 \qquad \textbf{(EQ Aux-203)}$$

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

$$f(x, k) = \frac{2\left(1 - kx^{\frac{1}{k} - 1}\right)}{(1 + (1 - kx^{1/k}))^2} \qquad 0 \leq x \leq \frac{1}{k}, k > 0 \qquad \textbf{(EQ Aux-204)}$$

The percent point function is computed numerically using a bisection method.

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

## SYNTAX
LET <y> = HFLPPF(<x>,<k>) <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 pdf value is stored;

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

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

## EXAMPLES
LET A = HFLPPF(0.9)
LET A = HFLPPF(0.9,0.5)
LET A = HFLPPF(A1)
LET X2 = HFLPPF(X1,GAMMA)

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

## DEFAULT
None

## SYNONYMS
None

## RELATED COMMANDS

| | | |
|---|---|---|
| HFLCDF | = | Compute the generalized half-logistic cumulative distribution function. |
| HFLPDF | = | Compute the generalized half-logistic probability density function. |
| LOGCDF | = | Compute the logistic cumulative distribution function. |
| LOGPDF | = | Compute the logistic probability density function. |
| 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
"Continuous Univariate Distributions - Vol. 2," 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (pp. 150-151).

APPLICATIONS

Lifetime Analysis

IMPLEMENTATION DATE

95/10

PROGRAM

MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
TITLE AUTOMATIC
X1LABEL HALF LOGISTIC DISTRIBUTION
PLOT HFLPPF(P) FOR P = 0 0.01 1
LET K = 0.5
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
PLOT HFLPPF(P,K) FOR P = 0 0.01 1
LET K = 1
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
PLOT HFLPPF(P,K) FOR P = 0 0.01 1
LET K = 2
X1LABEL HALF-LOGISTIC DISTRIBUTION - K = ^K
PLOT HFLPPF(P,K) FOR P = 0 0.01 1
END OF MULTIPLOT