HSECDF

PURPOSE

Compute the hyperbolic secant cumulative distribution function.

DESCRIPTION

The hyperbolic secant distribution has the following probability density function:

$$f(x) = \frac{\text{sech}(x)}{\pi} \qquad \textbf{(EQ Aux-205)}$$

where SECH is the hyperbolic secant function. The documentation for the SECH command describes this function in detail. The formula for the cumulative distribution function is:

$$F(x) = \frac{1}{2} + \frac{\arctan(\sinh(x))}{\pi} \qquad \textbf{(EQ Aux-206)}$$

where ARCTAN is the arc tangenet function and SINH is the hyperbolic sin function. The documentation for the ARCTAN and SINH commands describe these functions in detail.

SYNTAX

LET <y> = HSECDF(<x>) <SUBSET/EXCEPT/FOR qualification>

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

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

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

EXAMPLES

LET A = HSECDF(3)

LET X2 = HSECDF(X1)

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

HSEPDF	=	Compute the hyperbolic secant probability density function.
HSEPPF	=	Compute the hyperbolic secant percent point function.
LOGCDF	=	Compute the logistic cumulative distribution function.
LOGPDF	=	Compute the logistic probability density function.
LOGPPF	=	Compute the logistic percent point function.

REFERENCE

“Continuous Univariate Distributions - Vol. 2,” 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (page 147).

APPLICATIONS

Lifetime Analysis

IMPLEMENTATION DATE

95/10

PROGRAM

```
X1LABEL X
Y1LABEL PROBABILITY
TITLE AUTOMATIC
PLOT HSECDF(X) FOR X = -5 0.01 5
```