

**CHSPPF****PURPOSE**

Compute the chi-square percent point function with degrees of freedom parameter  $v$ .

**DESCRIPTION**

The input value should be between 0 and 1 and the degrees of freedom parameter  $v$  should be a positive integer. The chi-square distribution has the following probability density function:

$$f(x) = \frac{x^{\left(\frac{v}{2}-1\right)} e^{\left(\frac{-x}{2}\right)}}{2^{v/2} \Gamma\left(\frac{v}{2}\right)} \quad \text{for } x > 0 \quad (\text{EQ 8-143})$$

There is no simple closed form for the chi-square percent point function. It is computed numerically using a bisection method.

**SYNTAX**

LET <y2> = CHSPPF(<y1>,NU) <SUBSET/EXCEPT/FOR qualification>

where <y1> is a variable, a number, or a parameter in the range 0 to 1;

<y2> is a variable or a parameter (depending on what <y1> is) where the computed chi-square ppf value is stored;

<NU> is a positive integer (the degrees of freedom);

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

**EXAMPLES**

LET A = CHSPPF(0.9,10)

LET A = CHSPPF(A1,10)

LET Y = CHSPPF(X1,NU)

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

CHSCDF	=	Compute the chi-square cumulative distribution function.
CHSPDF	=	Compute the chi-square probability density function.
NCCCDF	=	Compute the non-central chi-square cumulative distribution function.
NCCPPF	=	Compute the non-central chi-square percent point function.
FCDF	=	Compute the F cumulative distribution function.
FPDF	=	Compute the F probability density function.
FPPF	=	Compute the F percent point function.
NORCDF	=	Compute the normal cumulative distribution function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.
TCDF	=	Compute the T cumulative distribution function.
TPDF	=	Compute the T probability density function.
TPPF	=	Compute the T percent point function.
GAMCDF	=	Compute the gamma cumulative distribution function.
GAMPPF	=	Compute the gamma percent point function.

**REFERENCE**

“Continuous Univariate Distributions - 1,” Johnson and Kotz, Houghton Mifflin, 1970 (chapter 17).

“Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55,” Abramowitz and Stegun, National Bureau of Standards, 1964 (page 941).

**APPLICATIONS**

Hypothesis Testing

## IMPLEMENTATION DATE

Pre-1987

## PROGRAM

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TITLE CHSPPF FOR VARIOUS VALUES OF NU
XILABEL X; YILABEL PROBABILITY
SEGMENT 1 COORDINATES 16 88 21 88; SEGMENT 1 PATTERN SOLID
SEGMENT 2 COORDINATES 16 84 21 84; SEGMENT 2 PATTERN DASH
SEGMENT 3 COORDINATES 16 80 21 80; SEGMENT 3 PATTERN DOT
SEGMENT 4 COORDINATES 16 76 21 76; SEGMENT 4 PATTERN DA2
LEGEND 1 NU = 5; LEGEND 1 COORDINATES 22 87
LEGEND 2 NU = 10; LEGEND 2 COORDINATES 22 83
LEGEND 3 NU = 20; LEGEND 3 COORDINATES 22 79
LEGEND 4 NU = 30; LEGEND 4 COORDINATES 22 75
XLIMITS 0 1
MAJOR XTIC NUMBER 6
MINOR XTIC NUMBER 1
XTIC DECIMAL 1
LINES SOLID DASH DOT DASH2
PLOT CHSPPF(X,5) FOR X = 0.01 .01 0.95 AND
PLOT CHSPPF(X,10) FOR X = 0.01 .01 0.95 AND
PLOT CHSPPF(X,20) FOR X = 0.01 .01 0.95 AND
PLOT CHSPPF(X,30) FOR X = 0.01 .01 0.95
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