

**HYPPPF****PURPOSE**

Compute the hypergeometric percent point function.

**DESCRIPTION**

The hypergeometric distribution is the probability of selecting LL marked items when a random sample of size KK is taken without replacement from a population a population of MM items, NN of which are marked. Marked and unmarked items can also be thought of as successes and failures. It has probability function:

$$p(x) = \frac{\binom{NN}{x} \binom{MM - NN}{KK - x}}{\binom{MM}{KK}} \quad (\text{EQ 8-245})$$

where  $\binom{a}{b}$  is the combinatorial function a things taken b at a time and has the formula:

$$\binom{a}{b} = \frac{a!}{b!(a-b)!} \quad (\text{EQ 8-246})$$

The ! symbol is the factorial function.

The percent point function is calculated numerically using a bisection method. The input value is a real number between 0 and 1.

**SYNTAX**

LET <y> = HYPPPF(<p>,<kk>,<nn>,<mm>) <SUBSET/EXCEPT/FOR qualification>

where <p> is a number, parameter, or variable in the interval (0,1) that specifies the desired probability;

<kk> is a positive integer number, parameter, or variable that is the size of the sample;

<nn> is a positive integer number, parameter, or variable that is number of marked items;

<mm> is a positive integer number, parameter, or variable that is number of items in the population;

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

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

**EXAMPLES**

LET A = HYPPPF(0.9,95,400,1500)

LET Y = HYPPPF(P,300,100,1300)

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

HYPCDF	=	Compute the hypergeometric cumulative distribution function.
HYPPDF	=	Compute the hypergeometric probability density function.
BINCDF	=	Compute the binomial cumulative distribution function.
BINPDF	=	Compute the binomial probability density function.
BINPPF	=	Compute the binomial percent point function.
POIPDF	=	Compute the Poisson probability density function.
POICDF	=	Compute the Poisson cumulative distribution function.
POIPPF	=	Compute the Poisson percent point function.
NBCDF	=	Compute the negative binomial cumulative distribution function.
NBPDF	=	Compute the negative binomial probability density function.
NBPPF	=	Compute the negative binomial percent point function.
GEOCDF	=	Compute the geometric cumulative distribution function.
GEOPDF	=	Compute the geometric probability density function.
GEOPPF	=	Compute the geometric percent point function.

## REFERENCE

- “A Remark on Algorithm AS 152: Cumulative Hypergeometric Probabilities,” Shea, Applied Statistics Journal, Vol. 38, No. 1, 1989.
- “Algorithm AS 152: Cumulative Hypergeometric Probabilities,” Lund, Applied Statistics, Vol. 31 (pp. 221-223).
- “The Accuracy of Piezer Approximations to the Hypergeometric Distribution, with Comparisons to Some Other Approximations,” Ling and Pratt, Journal of the American Statistical Association, March, 1984.
- “Statistical Distributions,” 2nd Edition, Evans, Hastings, and Peacock, Wiley and Sons, 1993, (chapter 20).
- “Discrete Univariate Distributions,” Johnson and Kotz, Houghton-Mifflin, 1969 (chapter 6).

## APPLICATIONS

Data Analysis

## IMPLEMENTATION DATE

94/9

## PROGRAM

```
XLIMITS 0 1
MAJOR XTIC NUMBER 6
MINOR XTIC NUMBER 1
XTIC DECIMAL 1
TITLE AUTOMATIC
XILABEL PROBABILITY
YILABEL X
PLOT HYPPPF(P,95,400,1200) FOR P = 0 0.01 1
```

