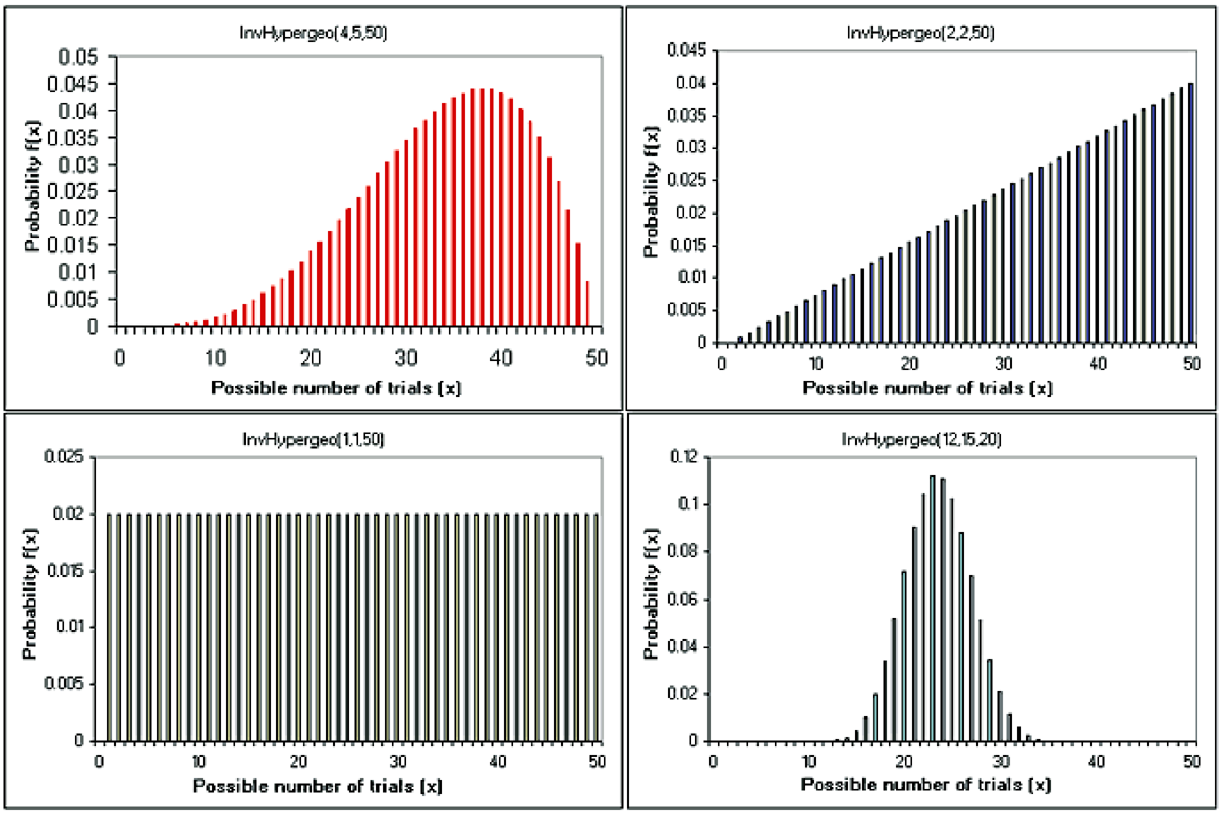
# Inverse Hypergeometric

InvHypergeo(s,D,M) - no Crystal ball distribution

Inverse hypergeometric equations

The Inverse Hypergeometric distribution InvHypergeo(s,D,M) models the total number of trials one would have before achieving the sth success in a hypergeometric sampling where there are D individuals of interest (their selection is a 'success') in a population of size M. Four examples of the Inverse Hypergeometric distribution are shown below:




## Uses

It should be used in any situation where there is hypergeometric sampling and one is asking the question: "How many samples will I need to get s successes?", or alternatively (if you subtract the number of success s) "How many failures will I see before I observe s successes?".

### Example

The number of cards one needs to turn over to see three hearts will be Inverse Hypergeometric distributed. If the total number of cards is 54, of which 13 are hearts, the number of cards one needs to turn over is InvHypergeo(3,13,54).

## Generation

The Inverse Hypergeometric distribution is not directly available with Crystal Ball, but can be easily constructed via the Discrete distribution as shown in the spreadsheet HyperGeoTrials. This model allows one to maintain the advantages of Latin Hypercube sampling.

## Comments

The Inverse Hypergeometric goes by a variety of other names: negative hypergeometric distribution, hypergeometric waiting time distribution, and the Mark ov-Polya distribution.

## Approximations

The need to construct the Inverse hypergeometric distribution makes it an appealing candidate to be approximated. Where the Hypergeometric process is closely approximated by a Binomial process (roughly, where the sample size is less than 10% of the population size), the Inverse Hypergeometric distribution is approximated by a Negative Binomial. Similarly, where D/M is small, the Inverse Hypergeometric distribution is approximated by the Gamma.