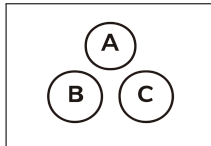


24

Discrete Distribution Hyper-geometric

O

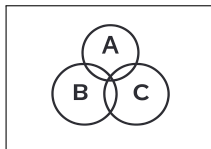


$$N = 5$$

$$K = 2$$

$$n = 2$$

$$k = 1$$

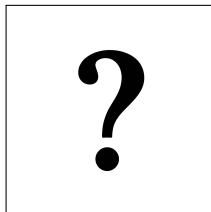


$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = 1) = \frac{\binom{2}{1} \binom{3}{1}}{\binom{5}{2}} = \frac{2 \times 3}{10} = \frac{6}{10} = \boxed{0.6}$$

$$E[X] = n \frac{K}{N}$$

$$\text{Var}(X) = n \frac{K}{N} \left(1 - \frac{K}{N}\right) \frac{N-n}{N-1}$$



$$N = 20$$

$$K = 11$$

$$n = 7$$

$$P(X \geq 4) = ?$$

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Discrete Distribution
Hyper-geometric

O



$$\begin{aligned} N &= 20 \\ K &= 11 \\ n &= 7 \\ P(X \geq 4) &= ? \end{aligned}$$

$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = 4) = 330 \times 84 = 27\,720$$

$$P(X = 5) = 462 \times 36 = 16\,632$$

$$P(X = 6) = 462 \times 9 = 4\,158$$

$$P(X = 7) = 330 \times 1 = 330$$

$$P(X \geq 4) = \sum_{k=4}^7 \frac{\binom{11}{k} \binom{9}{7-k}}{\binom{20}{7}}$$

$$P(X \geq 4) = \frac{48\,840}{77\,520} \approx \boxed{0.630}$$