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Discrete Distribution Hyper-geometric

K

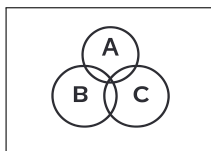


$$N = 5$$

$$K = 2$$

$$n = 2$$

$$k = 1$$

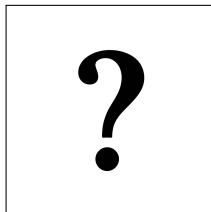


$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

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

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

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



$$N = 25$$

$$K = 10$$

$$n = 10$$

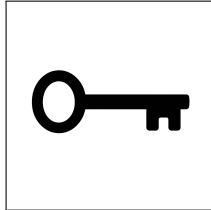
$$E[X] = ?$$

$$\text{Var}(X) = ?$$

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$$N = 25$$

$$K = 10$$

$$n = 10$$

$$E[X] = n \frac{K}{N} = 10 \cdot \frac{10}{25} = 4$$

$$\text{Var}(X) = n \frac{K}{N} \left(1 - \frac{K}{N}\right) \frac{N-n}{N-1} = 10 \cdot \frac{10}{25} \cdot \frac{15}{25} \cdot \frac{25-10}{24} = 1.5$$

$$\text{Var}(X)/E[X] = 1.5/4 = 0.375 = 3/8 \approx 0.375$$