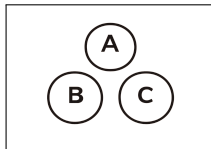


19

Discrete Distribution Bernoulli Trials

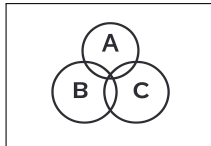
D



$$n = 2$$

$$p = 0.50$$

$$k = 1$$

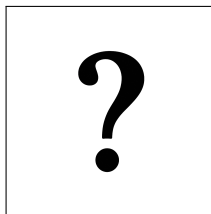


$$P(X = k) = \binom{n}{k} (p)^k (1 - p)^{n-k}$$

$$P(X = 1) = \binom{2}{1} (0.50)^1 (0.50)^1$$

$$P(X = 1) = 2 \times 0.50 \times 0.50$$

$$P(X = 1) = \boxed{0.50}$$



$$P(H_X) = 1/5$$

$$P(H_O) = 4/5$$

$$D = 1$$

$$N = 30$$

$$P(H_X | D) = ?$$

19

Discrete Distribution
Bernoulli Trials

D



$$P(H_X) = 1/5$$

$$P(H_O) = 4/5$$

$$D = 1$$

$$N = 30$$

$$P(H_X | D) = ?$$

$$P(D | H_X) = \binom{30}{1} (0.10)^1 (0.90)^{29} = 30 \cdot 0.10 \cdot 0.9^{29}$$

$$P(D | H_O) = \binom{30}{1} (0.02)^1 (0.98)^{29} = 30 \cdot 0.02 \cdot 0.98^{29}$$

$$P(H_X | D) = \frac{P(D|H_X) P(H_X)}{P(D|H_X) P(H_X) + P(D|H_O) P(H_O)}$$

$$P(H_X | D) = \frac{\left(\frac{1}{5}\right) 30 (0.10) (0.9)^{29}}{\left(\frac{1}{5}\right) 30 (0.10) (0.9)^{29} + \left(\frac{4}{5}\right) 30 (0.02) (0.98)^{29}}$$

$$P(H_X | D) \approx 0.0957$$