

13.04.2021.

Varianta 18

EX 6.

$$p = 0,12 \quad ; \quad q = 1 - 0,12 = 0,88$$

$$n = 1000 \quad ; \quad m = 100 + 18 = 118$$

$$P_{1000}(118) = C_{1000}^{118} \cdot p^{118} \cdot q^{1000-118}$$

$$= \frac{1000!}{118! \cdot (1000-118)!} \cdot 0,12^{118} \cdot 0,88^{882}$$

$$\approx 1,6 \cdot 10^{156} \cdot 2,2 \cdot 10^{-103} \cdot 1,08 \cdot 10^{-49} \approx$$

$$\approx \underline{\underline{3,801 \cdot 10^{-2}}}$$

EX 7.

$$n = 18 - \text{bile}$$

$$n_1 = 6 \quad n_2 = 7 \quad n_3 = 5$$

$$m = 9 - \text{bile extrașe lucasio}$$

$$m_1 = 4 \quad m_2 = 4 \quad m_3 = 1$$

A - { toate bilele extrașe vor fi albe }

B - { m_1 - albe , m_2 - negre , m_3 - albastre }

C - { m_1 - bile albe , iar restul de albe culoare }

$$P_1 = \frac{6}{18} \text{ - probabilitate exteazii - bil alb}$$

$$P_2 = \frac{7}{18} \text{ - negru}$$

$$P_3 = \frac{5}{18} \text{ - albestr}$$

$$P(A) = P_3(9, 0, 0) = \frac{9!}{9! \cdot 0! \cdot 0!} \left(\frac{6}{18}\right)^0 \left(\frac{7}{18}\right)^0 \left(\frac{5}{18}\right)^9 =$$

$$= \underline{\underline{6 \cdot 10^{-5}}}$$

$$P(B) = P_3(4, 4, 1) =$$

$$= \frac{9!}{4! \cdot 4! \cdot 1!} \cdot \left(\frac{6}{18}\right)^4 \cdot \left(\frac{7}{18}\right)^4 \cdot \left(\frac{5}{18}\right)^1 =$$

$$= 630 \cdot \left(\frac{6}{18}\right)^4 \cdot \left(\frac{7}{18}\right)^4 \cdot \frac{5}{18} = \underline{\underline{0,05}}$$

$$P(C) = P_3(4, 5) = \frac{9!}{4! \cdot 5!} \cdot \left(\frac{6}{18}\right)^4 \cdot \left(\frac{12}{18}\right)^5 =$$

$$= \underline{\underline{0,2}}$$

EX 8

Be Datele din ex 7, bilele nu sîrîn în urnă.

$P(A)$ - imposibil să extragem 3 bile albe când avem doar 3

$$P(B) = P_9(4, 4, 1) = \frac{C_6^4 \cdot C_7^4 \cdot C_5^1}{C_{18}^9} =$$

$$= \frac{\frac{6!}{4! \cdot 2!} \cdot \frac{7!}{4! \cdot 3!} \cdot \frac{5!}{1! \cdot 4!}}{\frac{18!}{9! \cdot 9!}} = \underline{\underline{0,053}}$$

$$P(C) = P_9(4, 5) = \frac{C_6^4 \cdot C_{12}^5}{C_{18}^9} =$$

$$= \frac{\frac{6!}{4! \cdot 2!} \cdot \frac{12!}{5! \cdot 7!}}{\frac{18!}{9! \cdot 9!}} = \underline{\underline{0,24}}$$

EX 9

$$m = 18 + 4 = 22$$

A - { nr 3 va apărea la ~~prima~~ ^{a. m. a} aruncare }

B - { la primele $\frac{18+4}{3}$ aruncări nu va apărea nr 3 }

$$p = \frac{1}{6} \text{ - pentru orice nr.}$$

$$q = \frac{5}{6}$$

$$P(A) = \frac{1}{6} \cdot \left(\frac{5}{6}\right)^{22-1} = \underline{0,0036}$$

$$P(B) = 9^{21} = \left(\frac{5}{6}\right)^{21} = \underline{0,021}$$

EX 10.

$$P = P(A)$$

$$n = 1000$$

$$P = 0,01$$

$$K = 9$$

$$K_1 = 7, K_2 = 17$$

~~HA~~ = { A se va realiza 9 din 1000 supedori }

~~AB~~ = { A va fi cuprins intre 7 si 17 }

①

Teorema Moivre - Laplace

$$P_n(K) \approx \frac{1}{\sqrt{2\pi n p q}} \cdot e^{-\frac{1}{2} \left(\frac{K - np}{\sqrt{npq}} \right)^2}$$

$$P_{1000}(9) \approx \frac{1}{\sqrt{2\pi \cdot 1000 \cdot 0,01 \cdot 0,99}} \cdot e^{-\frac{1}{2} \left(\frac{9 - 1000 \cdot 0,01}{\sqrt{1000 \cdot 0,01 \cdot 0,99}} \right)^2}$$

Teorema Poisson.

$$P_n(K) \approx \frac{a^K}{K!} \cdot e^{-a}, \quad a = n \cdot p$$

$$P_{1000}(9) \approx \frac{(1000 \cdot 0,01)^9}{9!} \cdot e^{-(1000 \cdot 0,01)}$$

$$p \approx \underline{0,125}$$

$$② P_{1000}(7 \leq k \leq 17) \approx$$

$$\approx \frac{1}{\sqrt{2\pi}} \int_{\frac{7-1000 \cdot 0,01}{\sqrt{1000 \cdot 0,01 \cdot 0,99}}}^{\frac{17-1000 \cdot 0,01}{\sqrt{1000 \cdot 0,01 \cdot 0,99}}} e^{-\frac{t^2}{2}} dt \approx 0,81.$$