



# 北京大学

习题三:

1. 最多一台机器需电脑管 即  $A_1, A_2, A_3$  三台机器要么都不需 要么只需1台即

$$\begin{aligned} P(A) &= P(A_1 A_2 \bar{A}_3) + P(\bar{A}_1 A_2 A_3) + P(A_1 \bar{A}_2 A_3) + P(A_1 A_2 \bar{A}_3) \\ &= 0.9 \times 0.8 \times 0.1 + 0.1 \times 0.8 \times 0.1 + 0.9 \times 0.2 \times 0.1 + 0.9 \times 0.8 \times 0.3 \\ &= 0.902. \end{aligned}$$

2. 电路图如下 如电路断电 A故障或 B、C皆故障 则A、B、C皆故障损坏.



$$D = A \cup BC$$

$$P(A) \quad P(D) = P(A) + P(BC) - P(ABC) = 0.3 + 0.2 \times 0.2 - 0.3 \times 0.2 \times 0.2 = 0.328.$$

3. 合格需两道都合格

设  $A = B \cup C$ . 则  $P(A) = P(B) + P(C) - P(BC)$

$$C = \bar{A} \cap \bar{B} \quad P(C) = P(\bar{A})P(\bar{B}) = (1 - 0.015)(1 - 0.02) \approx 0.965.$$

$$4. P\{\text{既能被2整除又能被5整除}\} = \frac{10}{100} = \frac{1}{10}$$

$$P\{\text{能被2整除或被5整除}\} = \frac{50 + 10}{100} = \frac{3}{5}$$

$$5. E = A \text{ 合格品率 } P(B) = (1 - 2\%)(1 - 5\%)(1 - 3\%)^2 = 0.876.$$

$$\text{次品率 } P(C) = 1 - P(B) = 12.4\%.$$

6.  $A =$  "至少出现2个正面"  $B =$  "正好3个正面"

$$P(B|A) = \frac{P(AB)}{P(A)} = \frac{P(B)}{P(A)} = \frac{C_5^3 (\frac{1}{2})^3 (\frac{1}{2})^2}{C_5^2 (\frac{1}{2})^2 (\frac{1}{2})^3 + C_5^3 (\frac{1}{2})^3 (\frac{1}{2})^2 + C_5^4 (\frac{1}{2})^4 (\frac{1}{2})^1} = \frac{5}{13}$$