

$$M' = \left\{ \begin{array}{l} (1, 1, 1, 1), (1, 1, 1, 0), (1, 1, 0, 1), (1, 0, 1, 1), (0, 1, 1, 1), (1, 1, 0, 0), (1, 0, 1, 0), (1, 0, 0, 1), \\ (1, 0, 0, 0) \end{array} \right\}$$

- La formule de la fiabilité dans les cas suivants

- Si les composants sont indépendants et la fiabilité du composant i est

p_i $i = 1, 2, 3, 4$

* Système I :(0.75 points)

$$\begin{aligned} R_I(p) &= P(\Phi_I(X) = 1) = P\left(X_1 \cdot \prod_{i=2}^4 X_i = 1\right) = P(X_1 = 1) P\left(\prod_{i=2}^4 X_i = 1\right) \\ &= P(X_1 = 1) \left(1 - P\left(\prod_{i=2}^4 X_i = 0\right)\right) \\ &= P(X_1 = 1) (1 - P(X_2 = 0) P(X_3 = 0) P(X_4 = 0)) \\ &= p_1 (1 - (1 - p_2)(1 - p_3)(1 - p_4)) = p_1 \cdot \left(\prod_{i=2}^4 p_i\right) \end{aligned}$$

Méthode 2 : $R_I(p) = P(\Phi_I(X) = 1) = P(X \in M) = P(X_1 = 1, X_2 = 1, X_3 = 1, X_4 = 1) +$
 $P(X_1 = 1, X_2 = 1, X_3 = 1, X_4 = 0) + P(X_1 = 1, X_2 = 1, X_3 = 0, X_4 = 1)$
 $+ P(X_1 = 1, X_2 = 0, X_3 = 1, X_4 = 1) + P(X_1 = 1, X_2 = 1, X_3 = 0, X_4 = 0)$
 $+ P(X_1 = 1, X_2 = 0, X_3 = 1, X_4 = 0) + P(X_1 = 1, X_2 = 0, X_3 = 0, X_4 = 1)$
 $= p_1 p_2 p_3 p_4 + p_1 p_2 p_3 (1 - p_4) + p_1 p_2 (1 - p_3) p_4 + p_1 (1 - p_2) p_3 p_4 + p_1 p_2 (1 - p_3) (1 - p_4) +$
 $p_1 (1 - p_2) p_3 (1 - p_4)$
 $+ p_1 (1 - p_2) (1 - p_3) p_4 = p_1 (1 - (1 - p_2)(1 - p_3)(1 - p_4)) = p_1 \cdot \left(\prod_{i=2}^4 p_i\right)$

* Système II : Ici on utilise la formule de la fonction de structure via les liens