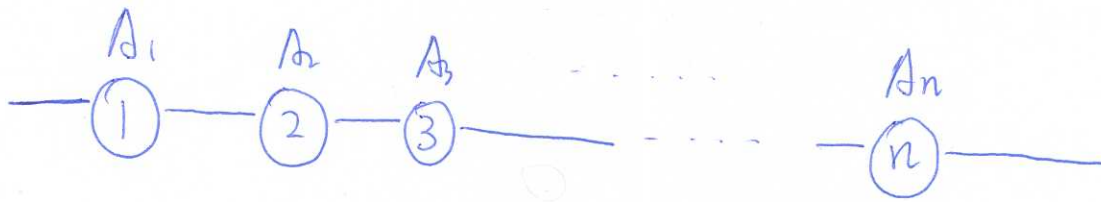


System S_i (Components in ~~Serial~~ Series)



for each A_i $P(A_i \text{ fail}) = q_i$, then:

$$P(\text{System } S_i \text{ fails}) = P\left(\bigcup_{i=1}^n A_i\right)$$

$$= P(A_1 \cup A_2 \dots \cup A_n)$$

$$= 1 - P\left(\bigcap_{i=1}^n A_i^c\right)$$

$$= 1 - \prod_{i=1}^n P(A_i^c) \quad \left. \begin{array}{l} \text{independency} \\ \swarrow \end{array} \right\}$$

$$= 1 - \prod_{i=1}^n (1 - p(A_i))$$

$$= 1 - \prod_{i=1}^n (1 - q_i) \quad (*)$$

If $q_1 = q_2 = \dots = q_n = q$

$$(*) = 1 - (1 - q)^n$$

OR: when $q_1 = q_2 = \dots = q_n = q$

$$\binom{n}{1} q (1 - q)^{n-1} + \binom{n}{2} q^2 (1 - q)^{n-2} + \dots + \binom{n}{n} q^n$$