

General definition of independence of events

The ^{set of} events $\{A_1, A_2, \dots, A_n\}$ are said to be independent if every subset

$\{A_{\bar{i}_1}, A_{\bar{i}_2}, \dots, A_{\bar{i}_k}\}$ with $1 \leq \bar{i}_1 < \bar{i}_2 < \dots < \bar{i}_k \leq n$

satisfies

$$P(A_{\bar{i}_1} \cap A_{\bar{i}_2} \cap \dots \cap A_{\bar{i}_k}) = P(A_{\bar{i}_1}) P(A_{\bar{i}_2}) \dots P(A_{\bar{i}_k})$$

Ex: A, B, C are said to be independent if the following conditions hold:

$$P(A \cap B) = P(A) P(B)$$

$$P(A \cap C) = P(A) P(C)$$

$$P(B \cap C) = P(B) P(C)$$

$$P(A \cap B \cap C) = P(A) P(B) P(C)$$