L109 Total Probability

martedì 14 marzo 2023 17:10

$$A = (B_1 \cap A) \cup (B_2 \cap A) \cup (B_3 \cap A)$$

$$\downarrow$$

$$P(A) = P(B_1 \cap A) + P(B_2 \cap A) + P(B_3 \cap A)$$

$$P(A \cap B) = P(A \mid B)\, P(B)$$ → CONDITIONAL PROBABILITY

$$P(A) = P(A \mid B_1) P(B_1) + P(A \mid B_2) P(B_2) + P(A \mid B_3) P(B_3)$$

TOTAL PROBABILITY

$$P(A) = \sum_i P(A \mid B_i) P(B_i)$$