Joint and Conditional Probabilities [nln44]

Joint probability: $P(AB)$ (event A and event B)

Conditional probability: $P(A|B)$ (event A if event B)

Relations: $P(AB) = P(A|B)P(B) = P(B|A)P(A)$

Simple consequences:

- If $A \subset B$ then $P(A|B) = P(A)/P(B)$
- If $B \subset A$ then $P(A|B) = 1$

Conditional probabilities satisfy probability axioms [nex90].

Bayes' theorem: $P(A|B) = P(B|A)\dfrac{P(A)}{P(B)}$

Applications:

▷ Successive random picks [nex91]

▷ Heads or tails [nex93]

▷ Quantity and quality [nex76]

▷ Diagnosis of a rare disease [nex77]

▷ Event or complement [nex9]