

Statistical Independence [nl45]

Case of two events A, B .

Criterion: $P(AB) = P(A)P(B)$

Simple consequences:

- $P(A|B) = P(A), \quad P(B|A) = P(B)$
- $P(A\bar{B}) = P(A)P(\bar{B}), \quad P(\bar{A}B) = P(\bar{A})P(B), \quad P(\bar{A}\bar{B}) = P(\bar{A})P(\bar{B})$

Case of three events A, B, C .

Criteria: pairwise statistical independence is not sufficient!

- $P(AB) = P(A)P(B)$
- $P(AC) = P(A)P(C)$
- $P(BC) = P(B)P(C)$
- $P(ABC) = P(A)P(B)P(C)$

Applications:

- ▷ Subtlety of statistical independence [nex1]
- ▷ Random train connections [nex92]
- ▷ Random inkjet printer [nex10]