

INDEPENDENT SIGMA ALGEBRAS

Definition

Given a probability space $(\Omega, \mathcal{F}, \mathbf{P})$, a sequence of $\mathcal{G}_1, \dots, \mathcal{G}_n$ of sub- σ -algebras of \mathcal{F} , are *independent* if

$$\mathbf{P}(A_1 \cap A_2 \cap \cdots \cap A_n) = \prod_{i=1}^n \mathbf{P}(A_i)$$

for any $A_1 \in \mathcal{G}_1$, $A_2 \in \mathcal{G}_2$, ..., $A_n \in \mathcal{G}_n$. A family $\{\mathcal{G}_i\}_{i \in I}$ is a family of sub- σ -algebras of \mathcal{F} is *independent* if any finitely many of them are independent.

