

Definition 2.1 Two random variables X and Y are independent, denoted by $X \perp Y$, if

$$p(x, y) = p(x)p(y)$$

for all x and y (i.e., for all $(x, y) \in \mathcal{X} \times \mathcal{Y}$).

Definition 2.2 (Mutual Independence) For $n \geq 3$, random variables X_1, X_2, \dots, X_n are mutually independent if

$$p(x_1, x_2, \dots, x_n) = p(x_1)p(x_2) \cdots p(x_n)$$

for all x_1, x_2, \dots, x_n .

Definition 2.3 (Pairwise Independence) For $n \geq 3$, random variables X_1, X_2, \dots, X_n are pairwise independent if X_i and X_j are independent for all $1 \leq i < j \leq n$.