



Definition

Let $X, Y : \Omega \rightarrow \mathbf{R}$ be random variables on probability space $(\Omega, \mathcal{F}, \mathbf{P})$. The *joint cumulative distribution function* denoted $F_{X,Y} : \mathbf{R}^2 \rightarrow [0, 1]$ is defined by $F_{X,Y}(s, t) = \mathbf{P}[X \leq s, Y \leq t]$.

In general the *joint cdf* for a random vector $X : \Omega \rightarrow \mathbf{R}^n$ is $F_X : \mathbf{R}^d \rightarrow [0, 1]$ defined by $F_X(t) = \mathbf{P}[X \leq t]$ where $x \leq t$ means $x_i \leq t_i$ for all i .

