

Definition 12.23 (Markov Random Field) Let $G = (V, E)$ be an undirected graph with $V = \mathcal{N}_n = \{1, 2, \dots, n\}$, and let X_i be a random variable corresponding to vertex i . The random variables X_1, X_2, \dots, X_n form a Markov random field represented by G if for all cutsets U in G , the sets of random variables $X_{V_1(U)}, X_{V_2(U)}, \dots, X_{V_s(U)}(U)$ are mutually independent conditioning on X_U .

Remarks