

- Each cutset  $U$  in  $G$  specifies an FCMI on  $X_1, X_2, \dots, X_n$ , denoted by  $[U]$ :  
 $[U] : X_{V_1(U)}, \dots, X_{V_{s(U)}(U)}$  are mutually independent conditioning on  $X_U$ .

- For a collection of cutsets  $U_1, U_2, \dots, U_k$  in  $G$ , introduce the notation

$$[U_1, U_2, \dots, U_k] = [U_1] \wedge [U_2] \wedge \dots \wedge [U_k]$$

where ‘ $\wedge$ ’ denotes ‘logical AND.’

- $X_1, X_2, \dots, X_n$  form a Markov graph  $G$  if and only if

$$[U \subset V : U \neq V \text{ and } s(U) > 1]$$

holds.

- Therefore, a Markov random field is simply a collection of FCMI’s induced by a graph.