Recall that for a nonempty atom $A = \tilde{Y}_1 \cap \tilde{Y}_2 \cap \cdots \cap \tilde{Y}_n \in \mathcal{F}_n$,

$$U_A = \{i \in \mathcal{N}_n : \tilde{Y}_i = \tilde{X}_i^c\}.$$

Definition 12.24 For a nonempty atom A of $\mathcal{F}_n$, if $s(U_A) = 1$, i.e., $G \backslash U_A$ is connected, then A is a Type I atom, otherwise A is a Type II atom. The sets of all Type I and Type II atoms of $\mathcal{F}_n$ are denoted by T_1 and T_2, respectively.

Theorem 12.25 $X_1, X_2, \cdots, X_n$ form a Markov graph G if and only if μ^* vanishes on all the Type II atoms.