



Figure 3.12 Rules for orienting edges in PDAG. Each rule lists a configuration of edges before and after an application of the rule.

Algorithm 3.5 Finding the class PDAG characterizing the P-map of a distribution P

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Procedure Build-PDAG (
   $\mathcal{X} = \{X_1, \dots, X_n\}$  // A specification of the random variables
   $P$  // Distribution of interest
)
1  $S, \{U_{X_i, X_j}\} \leftarrow$  Build-PMMap-Skeleton( $\mathcal{X}, P$ )
2  $\mathcal{K} \leftarrow$  Find-Immoralities( $\mathcal{X}, S, \{U_{X_i, X_j}\}$ )
3 while not converged
4   Find a subgraph in  $\mathcal{K}$  matching the left-hand side of a rule R1–R3
5   Replace the subgraph with the right-hand side of the rule
6 return  $\mathcal{K}$ 

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Example 3.10

Consider the DAG shown in figure 3.13a. After checking for immoralities, we find the graph shown in figure 3.13b. Now, we can start applying the preceding rules. For example, consider the variables B , E , and F . They induce a subgraph that matches the left-hand side of rule R1. Thus, we orient the edge between E and F to $E \rightarrow F$. Now, consider the variables C , E , and F . Their induced subgraph matches the left-hand side of rule R2, so we now orient the edge between C and F to $C \rightarrow F$. At this stage, if we consider the variables E , F , G , we can apply the rule R1, and orient the edge $F \rightarrow G$. (Alternatively, we could have arrived at the same orientation using C , F , and G .) The resulting PDAG is shown in figure 3.13c. ■