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**Algorithm 1** An algorithm to return a canonical unshielded triple of an RCM given a pair of (undirected) dependencies.  $R_r, R_s, R_t$ , and  $\mathbf{P}$  are as defined in the main text.

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1: procedure GET_ONE_CUT( $P.Y - \mathcal{V}_X, Q.Z - \mathcal{V}_Y, \mathcal{M}$ )
2:    $LL := LLRSP, eqint := (x, y) \mapsto x = y$  or  $LL(x, y) + LL(\tilde{x}, \tilde{y}) \leq \min(|x|, |y|)$ 
3:    $m := |P|, \ell := LL(\tilde{P}, Q), \mathbf{J} := \{(a, b) \mid P^a = Q^b, 1 \leq a \leq m - \ell + 1, \ell \leq b \leq |Q|\}$ 

4:   for  $(a_r, b_r)$  in  $\mathbf{J}$  such that  $LL(P^{a_r:-1}, Q^{b_r:}) = LL(P^{a_r:}, Q^{b_r:-1}) = 1$  and  $R_r.Z \notin adj(\mathcal{M}, \mathcal{V}_X)$  do
5:      $\ell_\alpha := LL(Q^{\ell:b_r:-1}, P^{a_r:-1})$ 
6:     if  $\ell_\alpha = 1$  then
7:       if  $eqint(P^{a_r:m-\ell+1}, Q^{\ell:b_r:-1})$  then
8:         return  $(\mathcal{V}_X, \{P.Y, (P^{a_r} \bowtie Q^{b_r:-1}).Y\}, R_r.Z)$ 

9:   else if  $\ell_\alpha < b_r - \ell + 1$  and  $a_r < m - \ell + 1$  and  $\ell < b_r$  then
10:    for  $(a_s, b_s)$  in  $\{(a, b) \in \mathbf{J} \mid a \leq a_r - \ell_\alpha + 1, \ell < b \leq b_r - \ell_\alpha + 1\}$  such that  $R_s.Z \notin adj(\mathcal{M}, \mathcal{V}_X)$  do
11:       $P_A, P_B, Q_A, Q_B := P^{a_s:-1}, P^{a_s:a_r-\ell_\alpha+1}, Q^{b_s:b_r-\ell_\alpha+1}, Q^{\ell:b_s:-1}$ 
12:      if  $LL(P_A, Q_A) > 1$  or  $LL(P_A, Q_B) > 1$  or not  $eqint(P_B, Q_A)$  or  $LL(P_B, Q_B) = \min(|P_B|, |Q_B|)$  then
13:        continue

14:      for  $(a_t, b_t)$  in  $\{(a, b) \in \mathbf{J} \mid a_r < a \leq m - \ell + 1, \ell \leq b < b_s - LL(P_B, Q_B) + 1\}$  such that  $R_t.Z \notin adj(\mathcal{M}, \mathcal{V}_X)$  do
15:         $P_C, P_D, Q_C, Q_D = P^{a_r:a_t:-1}, P^{a_t:m-\ell+1}, Q^{b_t:b_s-LL(P_B, Q_B)+1}, Q^{\ell:b_t:-1}$ 
16:        if  $LL(P_C, Q_C) > 1$  or  $LL(P_D, Q_C) > 1$  then
17:          continue

18:        if  $LL(P_C, Q_D) = 1$  and  $eqint(P_D, Q_D)$  then
19:          return any of  $(\mathcal{V}_X, \mathbf{P}.Y, R_r.Z), (\mathcal{V}_X, \mathbf{P}.Y, R_s.Z), (\mathcal{V}_X, \mathbf{P}.Y, R_t.Z)$ 

20:        else if  $1 < LL(P_C, Q_D) < \min(|P_C|, |Q_D|)$  and  $m - \ell + 1 < a_t$  and  $\ell < b_t$  then
21:          return any of  $(\mathcal{V}_X, \mathbf{P}.Y, R_r.Z), (\mathcal{V}_X, \mathbf{P}.Y, R_s.Z), (\mathcal{V}_X, \mathbf{P}.Y, R_t.Z)$ 

22:   return None

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