

$$\begin{aligned}
& \min \sum_{j \in J} c_j x_j \\
\text{subject to} \quad & \sum_{j, k \in \pi^{-1}(i)} y_{jk} \geq 1, \quad \forall i \in I, \\
& y_{jk} \leq x_j, \quad \forall j, k \in J \times J, (j < k), \\
& y_{jk} \leq x_k, \quad \forall j, k \in J \times J, (j < k), \\
& x_j = 0, 1, \quad \forall j \in J, \\
& 0 \leq y_{jk} \leq 1, \quad \forall j, k \in J \times J, (j < k).
\end{aligned}$$