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$$\begin{aligned}
 \min \quad & \sum_{r=1}^s s_r \\
 s.t \quad & \sum_{\substack{j=1 \\ j \neq k \\ n}} \lambda_j y_{rj} \geq y_{rk} \quad r = 1, \dots, s \\
 & \sum_{\substack{j=1 \\ j \neq k \\ n}} \lambda_j = 1 \\
 & \lambda_j \geq 0, \quad j \neq k \\
 & s_r \geq 0
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \min \quad & (s_1, \dots, s_s) \\
 s.t \quad & (x_p, (1 - (s_1, \dots, s_s))y_p) \in T_v
 \end{aligned} \tag{2}$$