1 Single machine scheduling with sum of completion times

MIP model:

$$\min \sum_{i \in [1,n]} s_i + d_i \tag{1}$$

$$s_i + d_i \leq s_j \qquad \forall (i,j) \in P \tag{2}$$

$$s_i + d_i \leq s_j + M.b_{ji} \qquad \forall i,j \in [1,n] : i \neq j \tag{3}$$

$$b_{ij} = 1 - b_{ji} \qquad \forall i,j \in [1,n] : i < j \tag{4}$$

$$\text{integer } s_i \in \mathbb{Z}^+ \qquad \forall i \in [1,n] \tag{5}$$

$$\text{integer } b_{ij} \in \{0,1\} \qquad \forall i,j \in [1,n] : i \neq j \tag{6}$$

CP Optimizer model:

$$\min \sum_{i \in [1,n]} \text{endOf}(o_i) \tag{1}$$

$$\text{endBeforeStart}(o_i, o_j) \qquad \forall (i,j) \in P \tag{2}$$

$$\text{noOverlap}([o_i]_{i \in [1,n]}) \tag{3}$$

$$\text{interval } o_i \text{ size } d_i \qquad \forall i \in [1,n] \tag{4}$$