

Traveling Salesman Problem (TSP)

Parameters

- n = amount of nodes (*index* i)
- c_{ij} = distance between node i and node j ($\forall i = 1, \dots, n \quad \forall j = 1, \dots, n$)

Variables

$$- x_{ij} = \begin{cases} 1 & \text{if the route goes from node } i \text{ to node } j; \\ 0 & \text{otherwise.} \end{cases}$$

- u_i = auxiliary variable for node i

$$\min \sum_{i=1}^n \sum_{j=1}^n c_{ij} \cdot x_{ij} \tag{1}$$

S.v

$$\sum_{i=1}^n x_{ij} = 1 \quad \forall j = 1, \dots, n \quad i \neq j \tag{2}$$

$$\sum_{j=1}^n x_{ij} = 1 \quad \forall i = 1, \dots, n \quad i \neq j \tag{3}$$

$$u_i - u_j + (n-1) \cdot x_{ij} \leq n-2 \quad \forall i = 2, \dots, n \quad i \neq j, \quad j = 2, \dots, n \tag{4}$$

$$x_{ij} \in \{0, 1\} \quad \forall i = 1, \dots, n \quad \forall j = 1, \dots, n \tag{5}$$

$$u_i \geq 0 \quad \forall i = 1, \dots, n \tag{6}$$