

Inputs

- A network $G = (N, A)$
- U_{ij} total capacity of arc (i, j)
- A set of *commodities* K each with its own MCNFP on G :
 - c_{ij}^k is the cost of sending one unit of commodity k on arc (i, j)
 - $u_{ij}^k \leq U_{ij}$ is the maximum number of units of commodity k that may be send over arc (i, j)
 - b_i^k supply or demand for units of commodity k at node i
- The $|K|$ MCNFPs are linked by the shared arc capacity U_{ij} .

LP Formulation

$$\begin{aligned} \min \quad & \sum_{\{k \in K, (i,j) \in A\}} c_{ij}^k x_{ij}^k \\ \text{s.t.} \quad & \sum_{\{j \in N: (i,j) \in A\}} x_{ij}^k - \sum_{\{j \in N: (j,i) \in A\}} x_{ij}^k = b_i^k \quad \forall k \in K, i \in N \\ & \sum_{k \in K} x_{ij}^k \leq U_{ij} \quad \forall (i,j) \in A \\ & 0 \leq x_{ij}^k \leq u_{ij}^k \quad \forall (i,j) \in A, k \in K \end{aligned}$$