

Decision Support in Production, Logistics and Supply Chain

Arezoo Amiri

Christof Brandstetter

Tamara Ertl

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1 New Formulation

ϵ_P is indicating if path $P = (s, i, j, t)$ is interdicted. A path is interdicted if arc (s, i) is of the path is interdicted. β still has the same meaning. Set S^j is a set of all paths that are going through vertex node j . And set S^i is a set of paths going through edge nodes i .

$$\begin{aligned}
 \min \quad & \sum_{(i,j) \in E} u_{(i,j)} \beta_{(i,j)} \\
 s.t. \quad & \beta_{(j,t)} \geq (1 - \epsilon_P) \quad \forall P \in S^j \quad \forall j \in N_{vertices} \\
 & \sum_{(i,j) \in E} \gamma_{(i,j)} \leq B \quad \forall P \in S^i \quad \forall i \in N_{edges}
 \end{aligned}$$

Old Formulation

$$\begin{aligned}
 \min \quad & \sum_{(i,j) \in E} u_{(i,j)} \beta_{(i,j)} \\
 s.t. \quad & \alpha_i - \alpha_j + \beta_{(i,j)} + \gamma_{(i,j)} \geq 0 \quad \forall (i,j) \in E \\
 & \alpha_t - \alpha_s \geq 1 \\
 & \sum_{(i,j) \in E} \gamma_{(i,j)} \leq B \\
 & \gamma_{(i,j)} = 0 \quad \forall (i,j) \notin firstlayer \\
 & \beta_{(i,j)} = 0 \quad \forall (i,j) \notin thridlayer
 \end{aligned}$$