$$\min \quad \sum_{(o,t)\in\Theta} \sum_{e\in IE(t)} f_e^{(o,t)} \cdot d_{(o,t)} \cdot r - \sum_{e'\in E} u_{e'} \cdot c_{e'} \tag{1a}$$

$$\max \quad \sum_{e\in E} \left(q_e - \sum_{(o,t)\in\Theta} f_e^{(o,t)} \cdot d_{(o,t)} \right) \tag{1b}$$

$$\text{subject to} \sum_{e\in IE(z)} f_e^{(o,t)} - \sum_{e'\in OE(z)} f_{e'}^{(o,t)} = 0, \qquad \forall\ z \in V \setminus \{o,t\},\ \forall (o,t) \in \Theta, \tag{1c}$$

$$\sum_{e\in OE(o)} f_e^{(o,t)} \leq 1, \qquad \forall\ (o,t) \in \Theta, \tag{1d}$$

$$\sum_{e\in OE(t)} f_e^{(o,t)} = 0, \qquad \forall\ (o,t) \in \Theta, \tag{1e}$$

$$\sum_{(o,t)\in\Theta} f_e^{(o,t)} \cdot d_{(o,t)} \leq u_e \cdot q,\ \ \forall\ e \in E, \tag{1f}$$

$$\sum_{v\in S} \sum_{w\in S} f_{(v,w)}^d \leq |S| - 1, \forall\ S \subset V,\ \forall\ d \in \Theta, \tag{1g}$$

$$f_e^{(o,t)} \in \{0,1\},\ \ \forall\ e \in E,\ \forall d \in \Theta, \tag{1h}$$

$$u_e \in \{0,1\},\ \ \forall\ e \in E \tag{1i}$$

Equation (1a) maximizes the profits of the agent while equation (1b) maximizes the free capacity left. This should be applayed in lexicograpchial order

Constraint (1c) ensures that, for any commodity, the flow that enters and leaves transit nodes (neither the origin neither the terminal) is equal.

Constraint (1d), together with (1g), ensures that any commodity, in case of be send, is completely send and only through and edge from its origin node.

Constraint (1e) ensures that none commodity is send from its terminal node. Constraint (1f) ensures that the capacity of edges is not exceed.

Constraint (1g) is a subtour elimination constraint.