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

$$\text{subject to} \tag{1b}$$

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

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

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

$$\sum_{(o,t,i)\in\Theta} f_e^{(o,t,i)} \cdot d_{(o,t,i)} \le u_e \cdot q_{(o,t,i)}, \qquad \forall\ e \in E, \tag{1f}$$

$$\sum_{v\in S} \sum_{w\in S} f_{(v,w)}^{(o,t,i)} \le |S| - 1, \qquad \forall\ S \subset V,\ \forall\ (o,t,i) \in \Theta, \tag{1g}$$

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

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

$$\sum_{(o,t,i)\in\Theta} \left[\sum_{e\in OE(o)} f_e^{(o,t,i)} \cdot d_{(o,t,i)} \cdot r_{(o,t,i)} - \right.$$

$$\left. - \sum_{\substack{e=(w,w,j)\in E\colon \\ j\neq i}} f_e^{(o,t,i)} \cdot d_{(o,t,i)} \cdot \frac{c_w}{q_e} \right] +$$

$$+ \sum_{\substack{(o,t,k)\in\Theta\colon \\ k\neq i}} \sum_{e=(v,w,i)\in E} f_e^{(o,t,k)} \cdot d_{(o,t,k)} \cdot \frac{c_e}{q_e} -$$

$$- \sum_{e=(v,w,i)\in E} c_e \cdot u_e \ge min\_payoff[i] \tag{1j}$$