Coal Line Maintenance

Sets N nodes
A arcs
T weeks

Data cap_a capacity for arc $a \in A$

f_a, t_a from and to nodes for arc $a \in A$
δ_a 1 if arc $a \in A$ has a maintenance, 0 otherwise.
d_a man days for maintaining arc $a \in A$
$days_t$ max man days in week $t \in T$

Variables x_{at} amount flowing on arc $a \in A$ in week $t \in T$

y_{at} 1 if maintain arc $a \in A$ in week $t \in T$
0 if not.

Objective max ~~$x_{Load1} + x_{Load2}$~~ $\sum_{t \in T} x_{Back,t}$

Constraints

$$x_{at} \leq cap_a (1 - y_{at}) \quad \forall a \in A, t \in T$$

$$\sum_{a \in A \text{ st } t_a = n} x_{at} = \sum_{a \in A \text{ st } f_a = n} x_{at} \quad \forall n \in N, t \in T$$

$$\sum_{a \in A} y_{at} \cdot d_a \leq days_t \quad \forall t \in T$$

$$x_{at} \geq 0 \quad \forall a \in A, t \in T$$

$$y_{at} \in \{0, 1\} \quad \forall a \in A, t \in T$$

$$\sum_{t \in T} y_{at} = \delta_a \quad \forall a \in A$$