December 12, 2017

1 ILP

The object function:

$$min \sum_{n \in N} w_n$$

Subject to:

$$\sum_{n \in N} W_{n,h} \geq demand_h, \forall h \in H \tag{1}$$

$$\sum_{h \in H} W_{n,h} \geq minHours * w_n, \forall n \in N \tag{2}$$

$$\sum_{h \in H} W_{n,h} \leq maxHours * w_n, \forall n \in N \tag{3}$$

$$\sum_{i \in [h, h+maxConsec]} W_{n,i} \leq maxConsec, \forall n \in N, \forall h \in [1, hours - maxConsec] \tag{4}$$

$$\sum_{i \in [h+maxPresence, hours]} W_{n,i} \leq hours*(1-W_{n,h}), \forall n \in N, \forall h \in [1, hours-maxPresence] \tag{5}$$

$$worksBefore_{n,h} \leq \sum_{i \in [i, h-1]} W_{n,i}, \forall n \in N, \forall h \in H \tag{6}$$

$$worksBefore_{n,h} * hours \geq \sum_{i \in [i, h-1]} W_{n,i}, \forall n \in N, \forall h \in H \tag{7}$$

$$worksAfter_{n,h} \leq \sum_{i \in [h+1, hours]} W_{n,i}, \forall n \in N, \forall h \in H \tag{8}$$

$$worksAfter_{n,h} * hours \geq \sum_{i \in [h+1, hours]} W_{n,i}, \forall n \in N, \forall h \in H \tag{9}$$

$$W_{n,h} + (1 - worksBefore) + (1 - worksAfter) + rest_{n,h} \geq 1, \forall n \in N, \forall h \in H \tag{10}$$

$$rest_{n,h} + rest_{n,h+1} \leq 1, \forall n \in N, \forall h \in [1, hours - 1] \tag{11}$$