Sets

I oils

T months

Data

$Cost_{it}$ cost (\$/tonne) of oil $i \in I$ in month $t \in T$

$Hard_i$ hardness of oil $i \in I$

$IsVeg_i$ { True, if oil $i \in I$ is vegetable
{ False, if not.

StoreCost cost of storage (\$/tonne/month)

StoreMax max storage (tonnes) for each oil.

Initial initial amount in storage of each oil.

MaxH, MinH max and min hardness of blend.

MaxVeg max processing (tonnes) of veg oil

MaxNonveg " " non-veg oil

Sell sell price (\$/tonne) of blend.

Variables

x_{it} amount of oil $i \in I$ to process (tonnes) in month $t \in T$

S_{it} amount of oil $i \in I$ in storage (tonnes) at end of month $t \in T$.

y_{it} amount of oil $i \in I$ purchased (tonnes) in month $t \in T$

Objective

Max Profit = Revenue − Costs

$$= \sum_{i \in I} \sum_{t \in T} Sell \times x_{it}$$

$$- \left(\sum_{i \in I} \sum_{t \in T} StoreCost \times S_{it} + \sum_{i \in I} \sum_{t \in T} Cost_{it} y_{it} \right)$$

Constraints

$$s_{i0} = \text{Initial} - x_{i0} + y_{i0} \qquad \forall i \in I$$

$$s_{it} = s_{i(t-1)} - x_{it} + y_{it} \qquad \forall i \in I, t \in T, \text{ st } t > 0$$

$$\sum_{i \in I} (\text{Hard}_i - \text{MinH})\, x_{it} \geq 0 \qquad \forall t \in T$$

$$\sum_{i \in I} (\text{Hard}_i - \text{MaxH})\, x_{it} \leq 0 \qquad \forall t \in T$$

$$\sum_{\substack{i \in I \\ \text{IsVeg}_i}} x_{it} \leq \text{MaxVeg} \qquad \forall t \in T$$

$$\sum_{\substack{i \in I \\ \text{not IsVeg}_i}} x_{it} \leq \text{MaxNonveg} \qquad \forall t \in T$$

$$s_{it} \leq \text{StoreMax} \qquad \forall i \in I, t \in T$$

$$x_{it}, y_{it}, s_{it} \geq 0 \qquad \forall i \in I, t \in T$$