11\13\09

Model 5

n items.

Resource constraint

$$K = \sum_{j=1}^{n} f_j Q_j \leq f$$

Minimize

$$\sum_{j=1}^{n} \left[\frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \right]$$

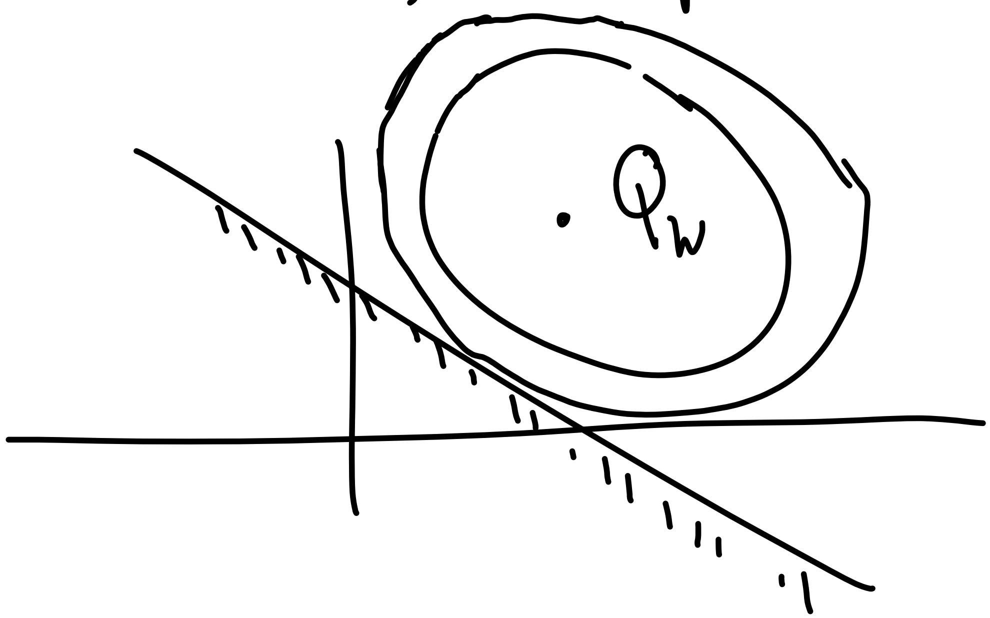
subject to

Step 1

Compute $Q_{jW} = (2\lambda A_j / I_j)^{1/2}$ $\quad j = 1, 2, \ldots, n$

See if this is feasible.

If feasible, then optimal.



Optimum satisfies

$\sum f_j Q_j = f$

Step 2

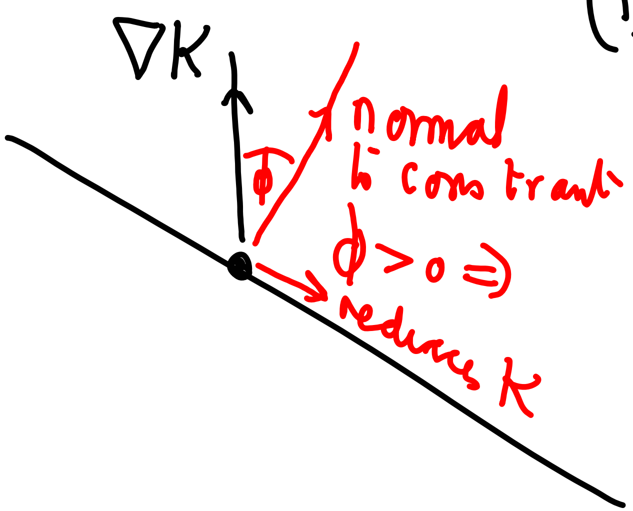
Solve $\quad$ Minimise K

s.t. $$\sum_{j=1}^{n} f_j Q_j = f \qquad (1)$$

Solve equations:

$$(1) \quad \& \quad \frac{\partial K}{\partial Q_j} = \theta f_j, \quad j = 1, \dots, n$$

unknown



$n+1$ equations in $n+1$ unknowns

$$(1) \equiv Q_j = \left(\frac{2 \lambda_j A_j}{I_j - 2\theta f_j} \right)^{1/2}$$

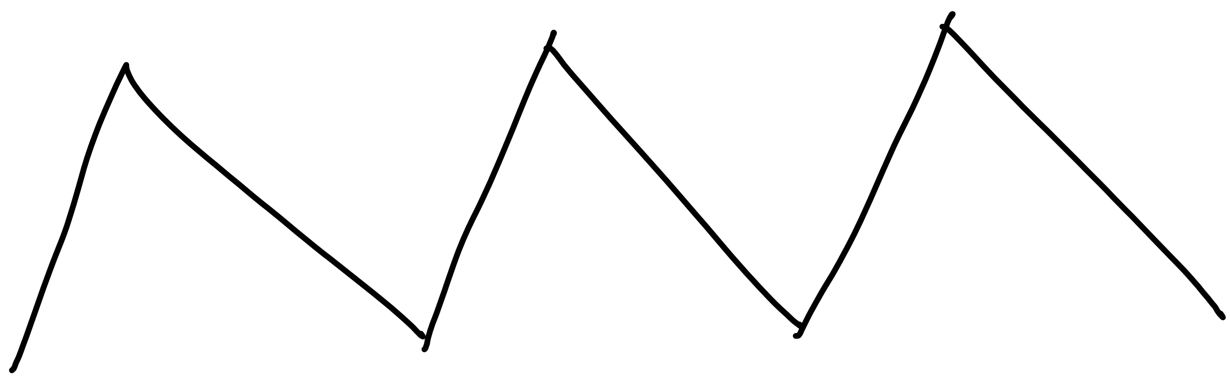
$$\sum_j f_j = f$$

Solve for θ, numerically.

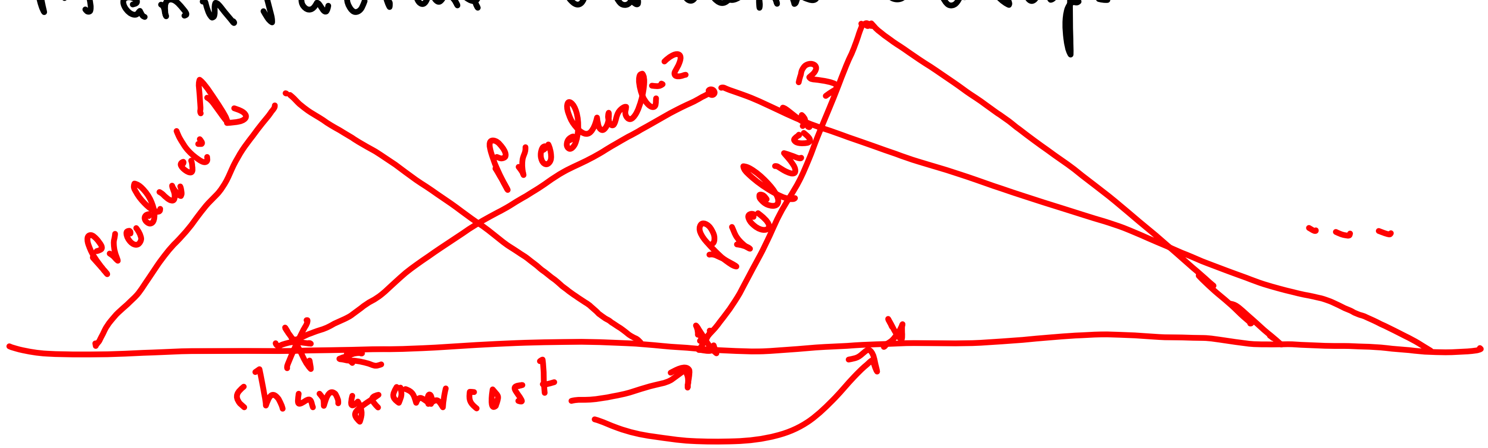
Model 6

n - items.

Each individually looks like



Manufacture the items oneself.



Assume first that we produce in sequence

1, 2, ..., n, 1,

Given this cycle there is a total change-over cost A.

$$\frac{\lambda_1 T}{\psi_1}$$

$$T_2 = \frac{\lambda_2 T}{\psi_2}$$

≤ 1

Production times $\left(\frac{\lambda_1}{\psi_1} + \frac{\lambda_2}{\psi_2} + \cdots\right) T$

Cost, given ordering of production is

$$\frac{A}{T} + \sum_{j=1}^{n} \frac{I_j}{2} * \underset{\lambda_j T}{\underset{\uparrow}{Q_j}} \left(1 - \frac{\lambda_j}{\psi_j}\right)$$

Strategy: $\forall$ sequences

minimise over T

and take best sequence.