

10/16/13

Monday

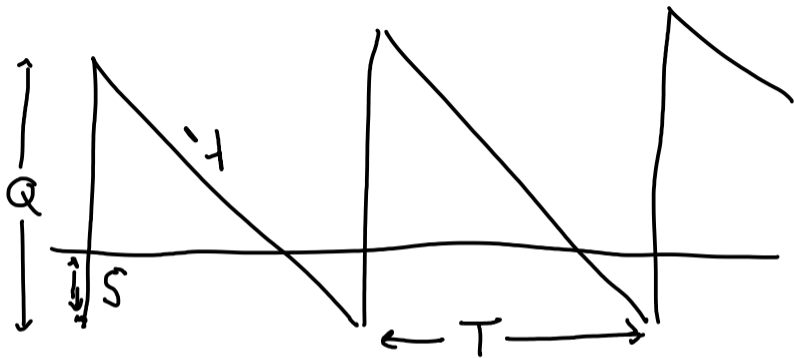


NO STOCKOUTS

ALLOWED



ALLOW
STOCKOUT

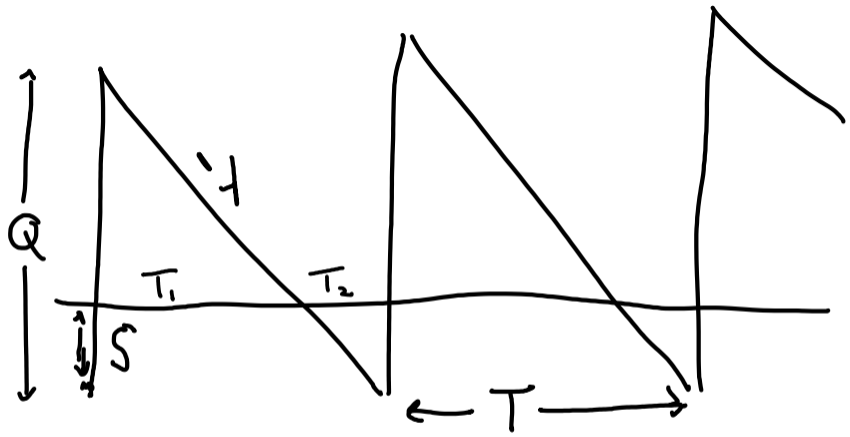


Q = order quantity

A = fixed cost of making an order

I = inventory charge per unit per period

π = penalty " " " " " "



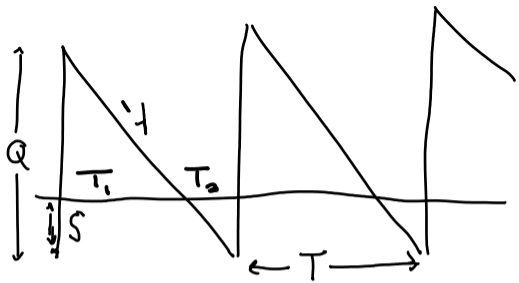
$$\text{Total cost} = \frac{A}{T} + \frac{I(Q-S) T_1}{2T} + \frac{\pi S T_2}{2T}$$

Cost =

Order cost $\frac{A}{T}$

Inventory Cost $+ \frac{I(Q-S)}{2} \cdot \frac{T_1}{T}$

Penalty cost $+ \frac{\pi S}{2} \cdot \frac{T_2}{T}$



$$T = \frac{Q}{\lambda}$$

$$T_1 = \frac{Q-S}{\lambda}$$

$$T_2 = T - T_1$$

$$\text{Total cost} = \frac{A}{T} + \frac{I(Q-S)T_1}{2T} + \frac{\pi S T_2}{2T}$$

Now write cost in terms of Q & S .

K is convex

$$K = \frac{A\lambda}{Q} + \frac{I(Q-S)^2}{2Q} + \frac{\pi S^2}{2Q}$$

K is a "nice" convex function so we set:

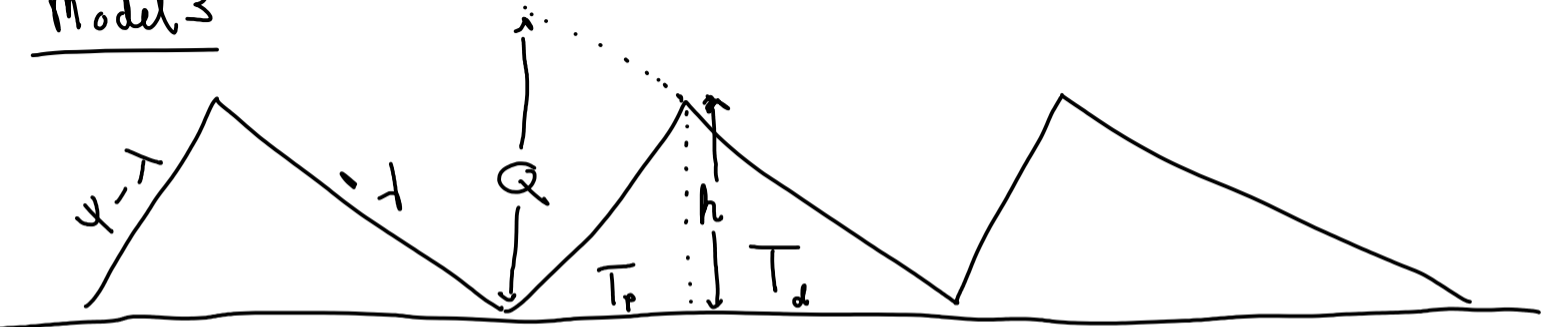
$$\frac{\partial K}{\partial Q} = \frac{\partial K}{\partial S} = 0$$

$$S = \sqrt{\frac{2\lambda A I}{\pi(\pi + I)}}$$

$$Q = \sqrt{\frac{2\lambda A}{I}} \times \sqrt{\frac{\pi + I}{\pi}}$$

$$K_v = \sqrt{2\lambda A I} \times \sqrt{\frac{\pi + I}{\pi}}$$

Model 3



Orders come in at the rate ψ .

A, I as before.

$$\text{Total cost} = \frac{A}{T} + \frac{Ih}{2}$$

$$\begin{aligned} h &= \lambda T_d & T_p + T_d &= T \\ &= (\psi - \lambda) T_p \\ \frac{h}{\lambda} + \frac{h}{\psi - \lambda} &= T & h &= \frac{\lambda(\psi - \lambda)}{\psi} T \end{aligned}$$

Total cost $K = \frac{A}{T} + \frac{I \lambda (\psi - \lambda) T}{2\psi}$

$$\frac{\partial K}{\partial T} = 0 \implies T = \sqrt{\frac{2A\psi}{I\lambda(\psi - \lambda)}} \quad K = \sqrt{\frac{2AI\lambda(\psi - \lambda)}{\psi}}$$

$$Q = \sqrt{\frac{2\lambda A\psi}{I(\psi - \lambda)}}$$