



IIT ROORKEE

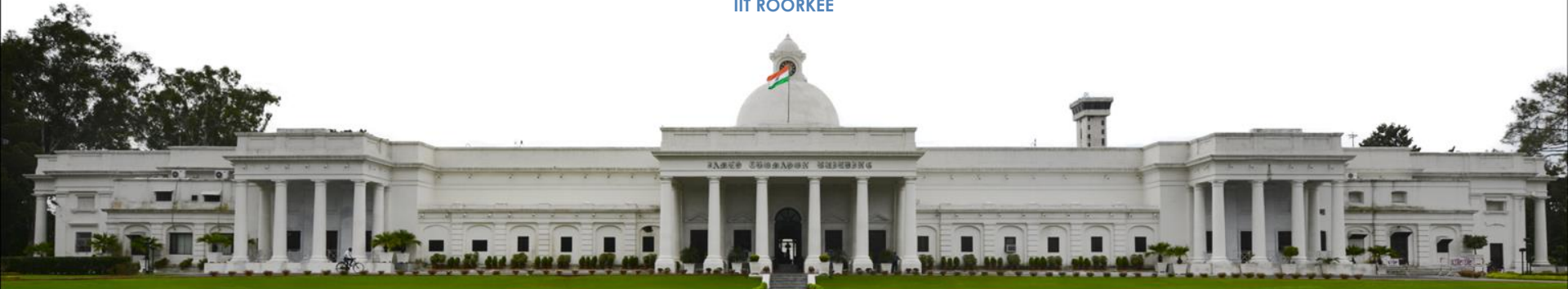


NPTEL ONLINE
CERTIFICATION COURSE

SUPPLY CHAIN ANALYTICS

Multi echelon Inventory Management (continued)

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Simultaneous Inventory Management at Two echelons

- Use echelon holding cost in place of installation holding cost

It is $e_1 = h_1$

$$e_2 = h_2 - h_1$$

$$n^* = \sqrt{k_1 e_2 / k_2 e_1}$$

if $n^* < 1$, take $n = 1$

if $n^* > 1$, let $[n^*]$ be the largest $\leq n^*$,

so $[n^*] \leq n^* < ([n^*] + 1)$, and then,

if $n^* / [n^*] \leq ([n^*] + 1) / n^*$, choose $n = [n^*]$.

if $n^* / [n^*] > ([n^*] + 1) / n^*$, choose $n = [n^*] + 1$.



Using integer value of n^* as n ,
determine

$$Q_2^* = \sqrt{2d(k_1/n+k_2)/(ne_1+e_2)}$$

Accordingly $Q_1 = n Q_2$

and Total inventory cost= $\sqrt{2d(k_1/n+k_2)(ne_1+e_2)}$



Take an example of two stage supply chain with following parameters,

$$k_1 = \text{Rs. } 1000, \quad h_1 = 2,$$

$$d = 600$$

$$k_2 = \text{Rs. } 100, \quad h_2 = 3,$$



	Individual optimization of the installations (use of installation holding cost)	Simultaneous optimization of the installations (use of echelon holding cost)
Q_2^*	200	379
n^*	$\sqrt{15}$	$\sqrt{5}$
n	4	2
Q_1^*	800	758
C	1950	1897

THANK YOU

