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$n=6,\ d_1=4,\ H=3,\ c(x) = x(20-x)$

i	f_1	x_1	f_2	x_2	f_3	x_3	f_4	x_4	f_5	x_5	f_6	x_6
0											64	4
1											51	3
2											36	2
3											19	1

$n=6,\ d_j=4,\ H=3,\ c(x) = x(20-x)$

$f_5(0) = \min \begin{array}{lr} 64+64 & 4 \\ 75+51 & 5 \\ 84+36 & 6 \\ 91+19 & 7 \end{array}$

i	f_1	x_1	f_2	x_2	f_3	x_3	f_4	x_4	f_5	x_5	f_6	x_6
0									110	7	64	4
1											51	3
2											36	2
3											19	1

$n=6,\ d_1=4,\ H=3,\ c(x)=x(20-x)$

$f_5(1) = \min \begin{matrix} 51+64 \\ 64+51 \\ 75+36 \\ 84+19 \end{matrix} \quad \begin{matrix} 3 \\ 4 \\ 5 \\ 6 \end{matrix}$

i	f_1	x_1	f_2	x_2	f_3	x_3	f_4	x_4	f_5	x_5	f_6	x_6
0									110	7	64	4
1									103	6	51	3
2									94	5	36	2
3									83	4	19	1

$n = 6$, $d_1 = 4$, $H = 3$, $c(x) = x(20-x)$

$f_4(0) = \min$

$64 + 110$		4
$75 + 103$		5
$84 + 94$		6
$91 + 83$		7

i	f_1	x_1	f_2	x_2	f_3	x_3	f_4	x_4	f_5	x_5	f_6	x_6
0							174	4 or 7	110	7	64	4
1									103	6	51	3
2									94	5	36	2
3									83	4	19	1

Variations

(1) Add a holding cost.

Suppose there is a holding cost of $h(i, x)$.

$$f_r(i) = \min_{x} \left[c(x) + h(i, x) + f_{r+1}(i + x - d_r) \right]$$

(11) Suppose you can back order some of the demand, up to limit L.

Back-order cost $= \pi$ per unit per period.

Allow a negative inventory at the start

$$f_r(i) = \min_{x} \left[c(x) - \pi \min\{0, i\} + h(x, i) + f_{r+1}(i + x - d_r) \right].$$

$-L \le i \le H$

(iii) Smoothing penalty.

Production $0, 100, 0, 100, 0, 100 \ldots$

costs more than $50, 50, 50, 50, 50, 50 \ldots$

even if $C(x) = Ax$

Add a cost $S(x_1, x_2)$ for succesive production x_1, x_2

$$f_r(i, y) = \min_x \left[C(x) + S(y, x) + f_{r+1}(i + x - d_r, x) \right]$$

last
period
production