8/27/10

Demand d_j, $j = 1, 2, \cdots, n$

$C(x)$ = cost of making x.

H = maximum stock capacity.

Problem: minimse cost of meeting demand on time.

Call this an n period problem.

Suppose we have an oracle that gives us the answer to n-1 period problems. How do we use it.

i [? how much should I make this period ?

1

$x = ?$: Cost = $c(X)$ +

$f_n(i)$ $\min_x c(x) + f_{n-1}(i+x-d_1)$

$f_r(i)$ = minimum cost of production in $r, r+1, \dots n$ starting with i in stock.

$$= \min_{\substack{X \geq 0 \\ X \geq d_r - i \\ i + X - d_r \leq H}} \left[c(X) + f_{r+1}(i + X - d_r) \right]$$

$$f_{n+1}(i) = 0, \forall i$$

$n = 4;\quad d = 3;\quad H = 3;\quad c(x) = 20x - x^2$

i	x_1	f_1	x_2	f_2	x_3	f_3	x_4	f_4
0	6	168	3 or 6	135	6	84	3	51
1	5	159	2	120	5	75	2	36
2	4	148	1	103	4	64	1	19
3	0 or 3	135	0	84	3	51	0	0

Suppose that we start with 1 in stock

$x_1 = 5,\quad x_2 = 0,\quad x_3 = 6,\quad x_4 = 0.$ [Solution]

r = 3

l = 0	X	Cost	
	3	51	+ 51
	4	64	+ 36
	5	75	+ 19
	6	84	+ 0 *

r=3

i=1

x	Cost
2	36 + 51
3	51 + 36
4	64 + 19
5	75 + 0 *

r=3

i=2

x	cost	
1	19 + 51	
2	36 + 36	
3	51 + 19	
4	64 + 0	*

r=3

i=3

x	cost
0	0 + 51
1	19 + 36
2	36 + 19
3	51 + 0 *

r = 2

i = 0

x	Cost	
3	51 + 84	*
4	64 + 75	
5	75 + 64	
6	84 + 51	*

r = 2

i = 1

x	Cost
2	36 + 84*
3	51 + 75
4	64 + 64
5	75 + 51

r=2

i=2

x	Cost			
1	19	+	84	*
2	36	+	75	
3	51	+	64	
4	64	+	51	

r = 2

i = 3

x	Cost		
0	0	+	84*
1	19	+	75
2	36	+	64
3	51	+	51

$r = 1$

$i = 0$

x	Cost
3	51 + 135
4	64 + 120
5	75 + 103
6	84 + 84*

$r = 1$

$i = 1$

x	Cost
2	36 + 135
3	51 + 120
4	64 + 103
5	75 + 84 *

$r = 1$

$i = 2$

x	Cost		
1	19	+	135
2	36	+	120
3	51	+	103
4	64	+	84*

$r = 1$

$i = 3$

x	Cost		
0	0	+	135
1	19	+	120
2	36	+	103
3	51	+	84 *