

TEXTBOOK PROBLEM #19 (SOLUTION)

Here is the table:

LOAD	:	1	2	3	4	5	6	7	8	9	10
lb loss/hr	:	4	3	3.5	2.5	1.5	5	6	4.5	2	3
lb content	:	32	24	14	10	6	40	48	36	16	18

Let $X_{ij} = \begin{cases} 1 & \text{if load } j \text{ is processed in hour } i \\ 0 & \text{if not} \end{cases}$

Let P_{ij} = the useable lobster content in load j at time i . These values can be precomputed from the table values.

Notice that $j=1,2,\dots,10$ and $i=1,2,\dots,5$. The limit of 5 on i comes from the fact that all ten boats can be processed within 5 hours because there are 2 processing plants. We have the table:

(P_{ij})	$j=1$	2	3	4	5	6	7	8	9	10
$i=1$	32	24	14	10	6	40	48	36	16	18
2	28	21	10.5	7.5	4.5	35	42	31.5	14	15
3	24	18	7	5	3	30	36	27	12	12
4	20	15	3.5	2.5	1.5	25	30	22.5	10	9
5	16	12	0	0	0	20	24	18	8	6

The objective: $Z = \sum_{i,j} P_{ij} X_{ij}$ (total edible content)

process 2 boats every hour: $\sum_{j=1}^{10} X_{ij} = 2, \quad i=1,2,\dots,5$

every boat contributes to the total content

$\sum_{i=1}^{H_j} X_{ij} = 1, \quad j=1,2,\dots,10$

$H_j = \begin{cases} 4 & j=3,4,5 \\ 5 & j=1,2,6,7,8,9,10 \end{cases}$