Untitled

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Results

In this section, we give an example of the solution of the optimization model we derived in the previous section. In this example, we consider an instant where $N = 6$ and $I = 51$, so that we have 2508 decision variables.

Parameters values

The following tables show the matrix of raw-material flexibility of all items.

Table 1: the flexibility matrix of items 1-25

	Raw material					
item	1	2	3	4	5	6
1	1	1	0	1	0	0
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	1	0	1	0	0
6	1	1	1	1	1	1
7	1	1	1	1	1	1
8	1	1	1	1	1	1
9	1	1	0	1	0	0
10	1	1	0	1	0	0
11	1	1	1	1	1	1
12	1	1	1	1	1	1
13	1	1	1	1	1	1
14	1	1	1	1	1	1
15	1	0	0	1	0	0

Next, we present the instant of the total raw material demands during a planning horizon.

Table 2: the flexibility matrix of items 26-51

	Raw material					
item	1	2	3	4	5	6
16	1	0	0	1	0	0
17	1	1	1	1	1	1
18	1	1	1	1	1	1
19	1	1	1	1	1	1
20	1	1	0	1	0	0
21	1	1	0	1	0	0
22	1	1	1	1	1	1
23	1	1	1	1	1	1
24	1	1	1	1	1	1
25	1	1	1	1	1	1
26	1	1	1	1	1	1
27	1	1	1	1	1	1
28	1	1	1	1	1	1
29	1	1	1	1	1	1
30	1	1	1	1	1	1
31	1	1	1	1	1	1
32	1	1	1	1	1	1
33	1	1	1	1	1	1
34	1	1	1	1	1	1
35	1	1	0	1	0	1
36	1	1	1	1	1	1
37	1	1	1	1	1	1
38	1	1	1	1	1	1
39	1	1	1	1	1	1
40	1	1	1	1	1	1
41	1	1	0	1	0	0
42	1	1	0	1	0	0
43	1	1	1	1	0	1
44	1	1	0	1	0	0
45	1	1	0	1	0	0
46	1	1	0	1	0	1
47	1	1	1	1	1	1
48	1	1	1	1	1	1
49	0	0	0	1	0	0
50	0	0	0	1	0	0
51	1	1	0	1	0	0

Table 3: the flexibility matrix of items 1-11

item	raw -material demand (in kg)			
	week 1	week 2	week 3	week 4
1	2,555.1	2,555.1	0.0	10,220.4
2	0.0	4,300.0	8,600.0	0.0
3	0.0	0.0	0.0	1,800.0
4	0.0	495.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	3,150.0	0.0	6,300.0	0.0
7	0.0	1,050.0	0.0	350.0
8	1,650.0	0.0	0.0	2,200.0
9	2,080.0	1,560.0	1,040.0	0.0
10	0.0	1,280.0	0.0	0.0

Table 4: the flexibility matrix of items 12-51

	raw-material demand (in kg)			
item	week 1	week 2	week 3	week 4
11	0.0	0.0	4,200.0	0.0
12	0.0	2,700.0	0.0	0.0
13	350.0	350.0	0.0	0.0
14	0.0	300.0	500.0	200.0
15	85.0	0.0	0.0	0.0
16	110.0	165.0	0.0	0.0
17	0.0	0.0	17,400.0	17,400.0
18	74,050.0	222,150.0	14,800.0	0.0
19	0.0	11,605.0	0.0	0.0
20	12,750.0	0.0	0.0	0.0
21	3,500.0	0.0	14,000.0	14,000.0
22	42,100.0	0.0	10,550.0	0.0
23	0.0	0.0	5,600.0	11,200.0
24	5,400.0	5,400.0	0.0	5,400.0
25	1,350.0	2,250.0	0.0	0.0
26	0.0	32,400.0	43,200.0	0.0
27	10,350.0	31,050.0	0.0	0.0
28	118,200.0	0.0	0.0	0.0
29	3,330.0	4,995.0	0.0	0.0
30	0.0	1,950.0	0.0	5,850.0
31	0.0	6,300.0	6,300.0	0.0
32	2,310.0	3,465.0	0.0	0.0
33	0.0	2,500.0	0.0	0.0
34	0.0	0.0	20,850.0	0.0
35	12,150.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	12,750.0	12,750.0	8,500.0	8,500.0
38	1,550.0	3,100.0	0.0	0.0
39	0.0	10,600.0	5,300.0	21,200.0
40	0.0	0.0	10,450.0	20,900.0
41	9,625.0	0.0	1,375.0	1,375.0
42	0.0	0.0	3,080.0	0.0
43	0.0	2,250.0	450.0	2,250.0
44	0.0	0.0	14,100.0	0.0
45	6,700.0	13,400.0	10,050.0	6,700.0
46	6,500.0	13,000.0	0.0	0.0
47	26,200.0	13,100.0	0.0	0.0
48	12,000.0	8,000.0	0.0	12,000.0
49	0.0	126.0	0.0	0.0
50	1,323.0	0.0	3,969.0	0.0
51	1,170.0	1,170.0	0.0	780.0