

18-52-Q1

Solution (a) balanced transportation problem Formula

$$\begin{aligned} \text{② Min } Z = & 20x_1 + 24x_2 + 24x_3 \\ & + 18x_4 + 23x_5 + 20x_6 \\ & + 20x_7 + 25x_8 + 26x_9 \end{aligned}$$

Subject to

$$\begin{cases} 20x_1 + 24x_2 + 24x_3 = 60 \\ 18x_4 + 23x_5 + 20x_6 = 70 \\ 20x_7 + 25x_8 + 26x_9 = 50 \\ 20x_1 + 18x_4 + 20x_7 = 40 \\ 24x_2 + 23x_5 + 25x_8 = 65 \\ 24x_3 + 20x_6 + 26x_9 = 75 \\ x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9 \geq 0 \end{cases}$$

(b) ① Vogel approximation method

		Retail Stores			Supply	row diff
		1	2	3		
Factory	1	20	24	24	60	4
	2	18	23	20	70	2
	3	20	25	26	50	5 max
Demand		40	65	75		
col diff		2	1	4		

② Iteration

		Retail Stores			
		1	2	3	supply
Factory	1	20	24	24	60
	2	18	23	20	70
	3	20	25	26	10
Demand		0	65	75	

row diff

0

3

1

col diff

1

(4) max

③ Iteration

		Retail Stores			
		1	2	3	supply
Factory	1	20	24	24	60
	2	18	23	20	0
	3	20	25	26	10
Demand		0	65	5	

row diff

0

1

col diff

1

(2) max

④ Iteration

		Retail Stores			
		1	2	3	supply
Factory	1	20	24 (55)	24 (5)	55
	2	18	23	20 (70)	0
	3	20 (40)	25 (10)	26	10
	Demand	0	65	0	

⑤ test optimal : find the large number of basic element col. or row.

		Retail Stores			
		1	2	3	supply
Factory	1	20 1	24 (55)	24 (5)	60 0
	2	18 3	23 3	20 (70)	70 -4
	3	20 (40)	25 (10)	26 1	50 1
	Demand	40	65	75	
		V_i	19	24	24

and compute
 $Cost = U_i + V_i$
 $cost - U_i - V_i$

⑥ Since all numbers of the table are nonnegative the result is optimal

(c) System Analysis (PPT 上没有, 应该不考)

		Retail Stores			
		1	2	3	supply
Factory	1	20	24	24	60
	2	18	23	20	70
	3	20	25	26+8	50
Demand		40	65	75	