11-

P_1, P_2, P_3, P_4 each 15 tons of product.

C_1, C_2, C_3 30, 16, 14 tons respectively

Minimize the transportation cost.

	C_1	C_2	C_3
P_1	100	100	50
P_2	650	110	100
P_3	60	65	75
P_4	150	90	70

Transportation cost for manufactured tire is 0,5/km

$\Rightarrow$

	C_1	C_2	C_3
P_1	50	50	25
P_2	325	55	50
P_3	30	32,5	37,5
P_4	75	45	35

Distance table

$\Rightarrow$

	C_1	C_2	C_3	Supply
P_1	50	50	25	15
P_2	325	55	50	15
P_3	30	32,5	37,5	15
P_4	75	45	35	15
Demand	30	16	14	BALANCED

Optimizar dada la solución

1º poner ε si solución degenerada (no cumple $m+n-1$).

				u_i
1 (18)	4 (8)	4 (17)		0
5 (3)	21 (15)	1 (4)		-14
ε (0)	9 (6)	2 (6)		-17
v_j 17	8	17	-	

Como los indicadores (triangulos) son no negativos, la solución es óptima.

$8 - u_1 - v_2 = 0$

$17 - u_1 - v_3 = 0$

$3 - u_2 - v_1 = 0$

$0 - u_3 - v_1 = 0$

$0 - u_3 - v_3 = 0$

$u_1 = 0$

$v_2 = 8$

$v_3 = 17$

$u_2 = -14$

$v_1 = 17$

$u_3 = -17$

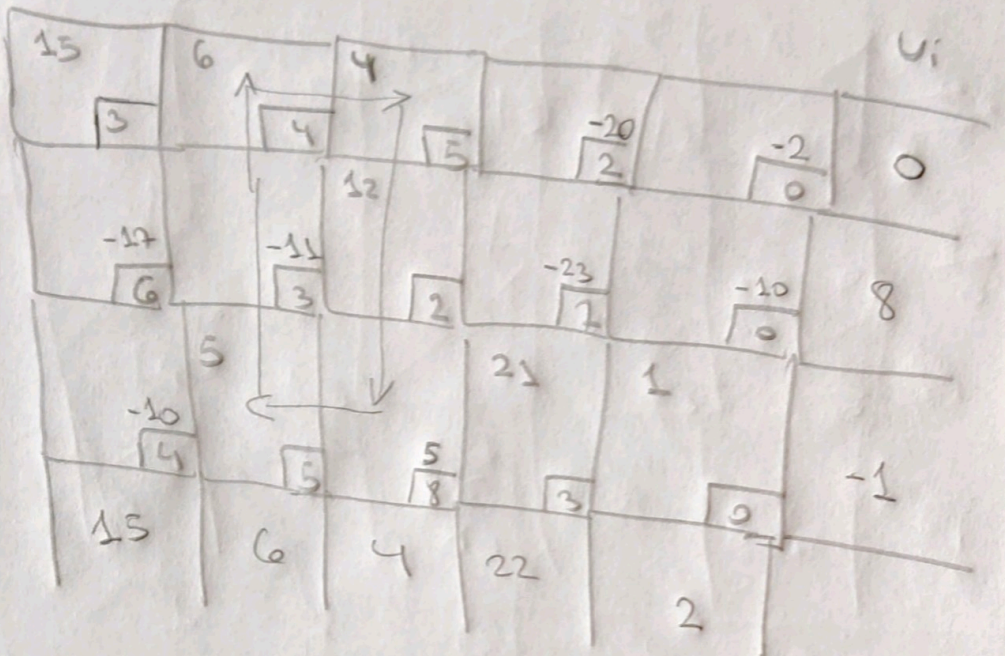
13-

	B_1	B_2	B_3	B_4	supply
P_1	60	40	45	55	130
P_2	70	55	65	60	200
P_3	80	60	85	75	170
	150	175	125	50	BALANCED

$P_1, P_2, P_3 \rightarrow 130, 200, 170$

$B_1, B_2, B_3, B_4 \rightarrow$ 150, 175, 125, 50

Optimize solution



$15 - U_1 - V_1 = 0$ $\begin{cases} U_1 = 0 \\ V_1 = 15 \end{cases}$

$6 - U_1 - V_2 = 0$ $\begin{cases} U_1 = 0 \\ V_2 = 6 \end{cases}$

$4 - U_1 - V_3 = 0$ $\begin{cases} U_1 = 0 \\ V_3 = 4 \end{cases}$

$12 - U_2 - V_3 = 0$ $\begin{cases} V_3 = 4 \\ U_2 = 8 \end{cases}$

$5 - U_3 - V_2 = 0$ $\begin{cases} V_2 = 6 \\ U_3 = -1 \end{cases}$

$21 - U_3 - V_4 = 0$ $\begin{cases} U_3 = -1 \\ V_4 = 22 \end{cases}$

$1 - U_3 - V_5 = 0$ $\begin{cases} U_3 = -1 \\ V_5 = 2 \end{cases}$

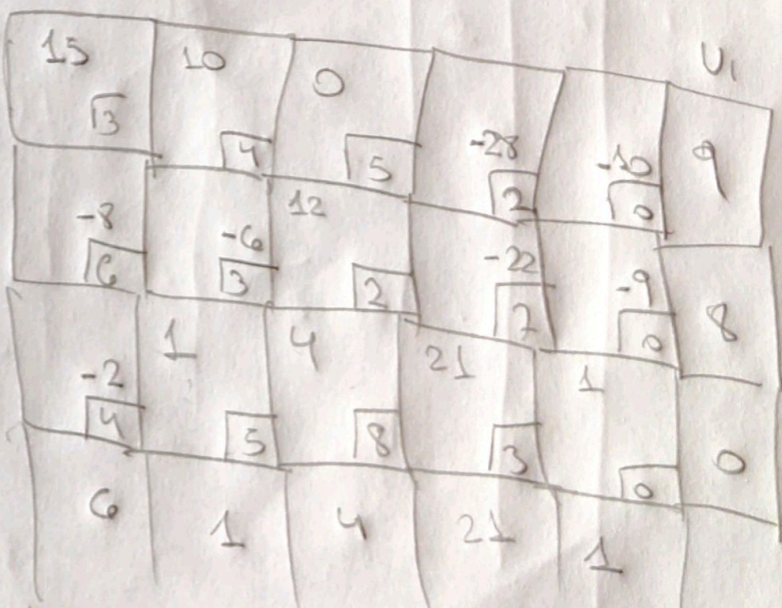
GH) $4 - \beta \rightarrow \beta = 4$

$5 - \beta \quad \beta$

1

10 0

1 4



$15 - U_1 - V_1 = 0$ $\begin{cases} U_1 = 9 \\ V_1 = 6 \end{cases}$

$10 - U_1 - V_2 = 0$ $\begin{cases} V_2 = 1 \\ U_1 = 9 \end{cases}$

$12 - U_2 - V_3 = 0$ $\begin{cases} V_3 = 4 \\ U_2 = 8 \end{cases}$

$1 - U_3 - V_2 = 0$ $\begin{cases} U_3 = 0 \\ V_2 = 1 \end{cases}$

$4 - U_3 - V_3 = 0$ $\begin{cases} U_3 = 0 \\ V_3 = 4 \end{cases}$

$21 - U_3 - V_4 = 0$ $\begin{cases} U_3 = 0 \\ V_4 = 21 \end{cases}$

$1 - U_3 - V_5 = 0$ $\begin{cases} U_3 = 0 \\ V_5 = 1 \end{cases}$

optimal solution

$X_{21} = 15$ $X_{23} = 12$ $X_{35} = 1$

$X_{12} = 10$ $X_{32} = 1$

$X_{13} = 0$ $X_{33} = 4$

1.5.1.

(5)

	H_1	H_2	H_3	H_4	Supply
I_1	9	11	11	8	400
I_2	7	12	14	10	200
I_3	11	10	12	16	620
Demand	300	340	400	440	

Not balanced

	H_1	H_2	H_3	H_4	Supply
I_1	9	11	11	8	400 / 0
I_2	200	7	12	14	10	200 / 0
I_3	100	340	140	40	100 / 0
I_4	12	10	12	16	620 / 580 / 400
			260		
	0				260
Rm	300 / 200	340 / 0	400 / 140 / 0	440 / 40 / 0	1420

1 1 1 – –

3 (3) – – –

1 1 1 1 1

0 – – – –

9 10 (11) 8

2 1 1 2

2 1 1 (8)

12 10 12 (16)

12 10 (12) –