

MÉTODO DE VOGEL

	Q	G	A	C	Oferta	Pen
V	120	180	90	230	5.000	50
M	150	200	80	250	5.000	50
L	100	190	70	270		
	4.000	4.000				
Demanda		5.000		5.000	20.000	
Pen						

$$Z = 4.000(100) + 4.000(190) + 5.000(200) + 2.000(80) + 5.000(230)$$

$$Z = 3\,470.000$$

	Q	G	A	C	Oferta	Pen
V	120	180	90	230		50
M	150	200	80	250	5.000	50
L	100	190	70	270		
	4.000	4.000				
Demanda				5.000	20.000	
Pen						

$$Z = 4.000(100) + 4.000(190) + 5.000(180) + 2.000(80) + 5.000(250)$$

$$Z = 3\,470.000$$

$$3+4-1=6$$

5 CELDAS BÁSICAS SOLUCIÓN DEGENERADA (5 < 6)

SOLUCIÓN NO DEGENERADA

$m+n-1$ = a las celdas llenas:

m: número de filas

n: número de columnas

SOLUCIÓN DEGENERADA

$m+n-1$ < a las celdas llenas:

MÉTODO DE DISTRIBUCIÓN MODIFICADA

	1	2	3	4	Oferta
A	12	13	4	6	500
B	6	4	10	11	700
C	10	9	12	4	800
Demanda	400	900	200	500	2.000

U \ V

	1	2	3	4	Oferta
A	12 400	13 100	4	6	
B	6	4 700	10	11	
C	10	9 100	12 200	4 500	
Demanda					2.000

$$Z = 400(12) + 100(13) + 700(4) + 100(9) + 200(12) + 500(4)$$

$$Z = 14.200$$

SOLUCIÓN NO DEGENERADA

$$U_1 + V_1 = 12$$

$$U_1 + V_2 = 13$$

$$U_2 + V_2 = 4$$

$$U_3 + V_2 = 9$$

$$U_3 + V_3 = 12$$

$$U_3 + V_4 = 4$$

$$U_1 = 0$$

$$V_1 = 12$$

$$U_2 = -9$$

$$V_2 = 13$$

$$U_3 = -4$$

$$V_3 = 16$$

$$V_4 = 8$$

COSTOS MARGINALES DE LAS CELDAS NO BÁSICAS

$$CM = C_{ij} - (U_i + V_j)$$

$$CM_{13} = 4 - (0 + 16)$$

$$CM_{13} = -12$$

$$CM_{14} = 6 - (0 + 8)$$

$$CM_{14} = -2$$

$$CM_{21} = 6 - (-9 + 12)$$

$$CM_{21} = 3$$

$$CM_{23} = 10 - (-9 + 16)$$

$$CM_{23} = 3$$

$$CM_{24} = 11 - (-9 + 8)$$

$$CM_{24} = 12$$

$$CM_{31} = 10 - (-4 + 12)$$

$$CM_{31} = 2$$

	1	2	3	4	Oferta
A	12 400	13 100	4 -12	6 -2	
B	6 3	4 700	10 3	11 12	
C	10 2	9 100	12 200	4 500	
Demanda					2.000

	1	2	3	4	Oferta
A	12 400	13	4 100	6	
B	6	4 700	10	11	
C	10	9 200	12 100	4 500	
Demanda					2.000

$$Z = 400(12) + 100(4) + 700(4) + 200(9) + 100(12) + 500(4)$$

$$Z = 13.000$$

SOLUCIÓN NO DEGENERADA

$$U_1 + V_1 = 12$$

$$U_1 + V_3 = 4$$

$$U_2 + V_2 = 4$$

$$U_3 + V_2 = 9$$

$$U_3 + V_3 = 12$$

$$U_3 + V_4 = 4$$

$$U_1 = 0$$

$$V_1 = 12$$

$$U_2 = 3$$

$$V_2 = 1$$

$$U_3 = 8$$

$$V_3 = 4$$

$$V_4 = -4$$

COSTOS MARGINALES DE LAS CELDAS NO BÁSICAS

$$CM = C_{ij} - (U_i + V_j)$$

$$CM_{12} = 13 - (0 + 1)$$

$$CM_{12} = 12$$

$$CM_{14} = 6 - (0 - 4)$$

$$CM_{14} = 10$$

$$CM_{21} = 6 - (3 + 12)$$

$$CM_{21} = -9$$

$$CM_{23} = 10 - (3 + 4)$$

$$CM_{23} = 3$$

$$CM_{24} = 11 - (3 - 4)$$

$$CM_{24} = 12$$

$$CM_{31} = 10 - (8 + 12)$$

$$CM_{31} = -10$$

	1	2	3	4	Oferta
A	12 300	13	4 200	6	
B	6	4 700	10	11	
C	10 100	9 200	12	4 500	
Demanda					2.000

$$Z = 300(12) + 200(4) + 700(4) + 200(9) + 100(10) + 500(4)$$

$$Z = 12.000$$

SOLUCIÓN NO DEGENERADA

$$U_1 + V_1 = 12$$

$$U_1 + V_3 = 4$$

$$U_2 + V_2 = 4$$

$$U_3 + V_1 = 10$$

$$U_3 + V_2 = 9$$

$$U_3 + V_4 = 4$$

$$U_1 = 0$$

$$V_1 = 12$$

$$U_2 = -7$$

$$V_2 = 11$$

$$U_3 = -2$$

$$V_3 = 4$$

$$V_4 = 6$$

COSTOS MARGINALES DE LAS CELDAS NO BÁSICAS

$$CM = C_{ij} - (U_i + V_j)$$

$$CM_{12} = 13 - (0 + 11)$$

$$CM_{12} = 2$$

$$CM_{14} = 6 - (0 + 6)$$

$$CM_{14} = 0$$

$$CM_{21} = 6 - (-7 + 12)$$

$$CM_{21} = 1$$

$$CM_{23} = 10 - (-7 + 4)$$

$$CM_{23} = 13$$

$$CM_{24} = 11 - (-7 + 6)$$

$$CM_{24} = 12$$

$$CM_{33} = 12 - (-2 + 4)$$

$$CM_{31} = 10$$

TODOS POSITIVOS SOLUCIÓN ÓPTIMA

$$Z = 12.000$$

COMPROBACIÓN EN POM QM FOR WINDOWS

optimal solution. More than one optimal solution exists

Objective

☐ Maximize

☒ Minimize

Starting method

Northwest Corner Method

Transportation Results

(untitled) Solution

solution value = \$12000

	1	2	3	
A	300	(2)	200	(0)
B	(1)	700	(13)	(12)
C	100	200	(10)	500

Columns Columns Screen Row(s) Column(s) Down

10 0.00 0.00 Fix Dec 0.0 0.00 0.00 Selected cells formatting B I U

Results available in additional windows. These may be opened by using the SOLUTIONS menu in the Main Menu.

Objective

☐ Maximize

☒ Minimize

Starting method

Northwest Corner Method

(untitled) Solution

	1	2	3	4
Iteration 1				
A	400	100	(-12)	(-2)
B	(3)	700	(3)	(12)
C	(2)	100	200	500
Iteration 2				
A	400	(12)	100	(10)
B	(-9)	700	(3)	(12)
C	(-10)	200	100	500
Iteration 3				
A	300	(2)	200	(0)
B	(1)	700	(13)	(12)
C	100	200	(10)	500

PRÁCTICA CON EL SOFTWARE

	1	2	3	4	Oferta
A	17	20	13	12	70
B	15	21	26	25	90
C	15	14	15	17	115
Demanda	50	60	70	95	200

Z= 5.305

Z= 5.005

Z= 4.465

Z= 4.185

PROBLEMAS DESBALANCEADOS

	CIUDAD 1	CIUDAD 2	CIUDAD 3	Capacidad
PLANTA 1	\$ 600	\$ 700	\$ 700	25
PLANTA 2	\$ 320	\$ 300	\$ 350	40
PLANTA 3	\$ 500	\$ 480	\$ 450	50
Demanda	30	35	25	115 90

La oferta no es igual a la demanda insertamos una columna FICTICIA con valores de 0 PARA BALANCEAR LA MATRIZ

	CIUDAD 1	CIUDAD 2	CIUDAD 3	FICTI	Capacidad
PLANTA 1	\$ 600	\$ 700	\$ 700	0	25
PLANTA 2	\$ 320	\$ 300	\$ 350	0	40
PLANTA 3	\$ 500	\$ 480	\$ 450	0	50
Demanda	30	35	25	25	115