



Tarea 4opti - Ejercicios de optimización

Optimización (Universidad Autónoma de Nuevo León)



Escanea para abrir en Studocu



**UNIVERSIDAD AUTÓNOMA DE
NUEVO LEÓN**



**FACULTAD DE INGENIERÍA
MECÁNICA Y ELÉCTRICA**

**OPTIMIZACIÓN.
TAREA 04.**

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Ejercicio 2.

$$Z_{\max} = 60x_1 + 50x_2$$

$$x_1 + 2x_2 \leq 40$$

$$2x_1 + 3x_2 \geq 6$$

$$2x_1 + x_2 \leq 40$$

$$3x_1 + 2x_2 \geq 6$$

$$Z_{\max} = 60x_1 + 50x_2 + 0s_2 + 0s_3 + 0s_1 - M A_1 - M A_2$$

Salir

		60	50	0	0	0	-M	0	-M
		x_1	x_2	s_2	s_4	s_1	A_1	s_3	A_2
OS1	40	1	2	0	0	1	0	0	0
-MA1	6	2	3	-1	0	0	1	0	0
OS3	40	2	1	0	0	0	0	1	0
-MA2	6	3	2	0	-1	0	0	0	1(1/5)
-12M+0		-5M	-5M	M	M	0	0	0	0

Pivote

Entra

$$-5(100) - 60 = -560 \quad -5(100) - 50 = -550$$

valor más negativo

* No es óptima ya que tienen que ser todos positivos y/o ceros.

Salir

		60	50	0	0	0	-M	0	-M
		x_1	x_2	s_2	s_4	s_1	A_1	s_3	A_2
OS1	38	0	4/3	0	1/3	1	0	0	-1/3
-MA1	2	0	5/3	-1	2/3	0	1	0	-2/3 (3/5)
OS3	36	0	-1/3	0	2/3	0	0	1	-2/3
60x1	2	1	2/3	0	-1/3	0	0	0	1/3
-2M+120		0	-5/3M	M	-2/3M	0	0	0	15/3M+20

Entra

$$-5/5(100) - 10 = -550 \quad -2/3(100) - 20 = -260/3$$

Nuevos elementos

$$40 - [6 \cdot 1/3] = 38 \quad 6 - [6 \cdot 2/5] = 2 \quad 40 + [6 \cdot 2/3] = 36 \quad -12M - [6 \cdot (-5M - 60)/3] = -2M + 120$$

$$x_2: 2 - [2 \cdot 1/3] = 5/3 \quad 3 - [2 \cdot 2/3] = 5/3 \quad 1 - [2 \cdot 2/3] = -1/3 \quad -5M - 50 + [2 \cdot (-5M - 60)/3] = -2/3M - 20$$

$$s_4: 0 - [1 \cdot 1/3] = -1/3 \quad 0 - [2 \cdot 1/3] = -2/3 \quad 0 - [2 \cdot 1/3] = -2/3 \quad M - [1 \cdot (-5M - 60)/3] = 2/3M + 20$$

$$A_2: 0 - [1 \cdot 1/3] = -1/3 \quad 0 - [2 \cdot 1/3] = -2/3 \quad 0 - [2 \cdot 1/3] = -2/3$$

$$0 - [(-5M - 60) \cdot 1/3] = 5/3M + 20$$

Salic

	60 X1	50 X2	0 S2	0 S4	0 S1	-M A1	0 S3	-M A2
OS1	182/5	0	1/5	-1/5	1	-1/5	0	1/5
50X2	6/5	0	1	2/5	0	3/5	0	-2/5
OS3	182/5	0	-1/5	4/5	0	1/5	1	-1/5
60X1	6/5	1	2/5	-3/5	0	-2/5	0	3/5
132	0	0	-6	-16	0	+6	0	+16

Pivote

Entra

38 - [2 - 4/3 / 5 / 3] = 182/5 36 - [2 - 1/3 / 5 / 3] = 182/5 2 - [2 - 2/3 / 5 / 3] = 6/5 - [2M / 120] - [2(-5/3M - 10) / 5 / 3] = 0M + 132

52 - 0 - [4/3 - 1/5 / 3] = 4/5 0 - [-1/3 + 1/5 / 3] = -1/5 0 - [1 - 2/3 / 5 / 3] = 2/5

M - [-1 - (-5/3M - 10) / 5 / 3] = 0M - 6

S4: 1/3 - [4/3 - 2/3 / 5 / 3] = 1/5 2/3 - [2/3 - 1/3 / 5 / 3] = 4/5 -1/3 [2/3 - 2/3 / 5 / 3] = -3/5

(-2/5M - 20) - [2/3 - (-5/5M + 10) / 5 / 3] = 0M - 16

A1: 0 - [1 - 1/3 / 5 / 3] = -1/5 0 - [1 - 2/3 / 5 / 3] = -2/5

A2: -1/3 - [4/3 - 2/3 / 5 / 3] = -1/5 -2/3 - [1/3 - 2/3 / 5 / 3] = -4/5 1/3 - [2/3 - 2/3 / 5 / 3] = 3/5

Salic

	60 X1	50 X2	0 S2	0 S4	0 S1	-M A1	0 S3	-M A2
OS1	37	0	1/2	0	1	-1/2	0	0
OS4	3	0	5/2	-3/2	1	3/2	0	-1
OS3	34	0	-2	1	0	-1	1	0
60X1	3	1	3/2	-1/2	0	1/2	0	0
180	0	40	-30	0	0	+30	0	M

Pivote

Entra

182/5 - [4/5 - 1/5 / 2 / 5] = 37 137 - [6/5 - 16/2 / 5] = 180 182/5 - [4/5 - 6/5 / 2 / 5] = 34 6/5 - [4/5 - 5/5 / 2 / 3] = 3

$$\begin{aligned}
 x2: 0 - [1 - 1/5 | 2/5] &= 1/2 \quad 0 [1 - 4/5 | 2/5] = -2 \quad 0 - [1 - 3/5 | 2/5] = +3/2 \\
 0 - [1 - 16/2 | 5] &= 40 \\
 s2: 4/5 - [-1/5 - 3/5 | 2/5] &= 1/2 \quad -1/5 - [4/5 - 3/5 | 2/5] = 1/5 - [-3/5 - 3/5 | 2/5] = 1/2 \\
 -6 - [-16 - 3/5 | 2/5] &= -30 \\
 A1: -4/5 - [-1/5 - 3/5 | 2/5] &= -1/2 \quad 1/5 - [3/5 - 4/5 | 2/5] = -1 \\
 (M+6) - [3/5 - 16/2 | 5] &= M+30
 \end{aligned}$$

Sale		60	50	0	0	0	-M	0	-M	
		x1	x2	s2	s4	s1	A1	s3	A2	
OS1	20	0	3/2	0	0	1	0	-1/2	0	(2/3)
OS4	54	0	-1/2	0	1	0	0	3/2	-1	
OS2	34	0	-2	1	0	0	-1	1	0	
60x1	20	1	1/2	0	0	0	0	1/2	0	
		0	20	0	0	0	M	30	M	

→ Entra

$$\begin{aligned}
 33 - [34 - 1/2 | 1] &= 20 \quad 3 - [34 - 3/2 | 1] = 54 \quad 3 + [34 - 1/2 | 1] = 20 \\
 180 - [34 - 30/2] &= 1200 \quad s3: 0 - [1 - 1/2 | 3] = -1/2 \quad 0 - [1 - 3/2 | 1] = 3/2 \\
 0 - [1 - 1/2 | 1] &= 1/2 \quad 0 - [1 - 30/1] = 30 \quad x2: 1/2 - [1/2 - 2/1] = 3/2 \quad s2: -3/2 - [1/2 - 2/1] = -1/2 \\
 3/2 - [-2 - 1/2 | 1] &= 1/2 \quad 40 - [30 - 2 | 1] = -20 \quad s4: 0 - [1 - 3/2 | 1] = 3/2
 \end{aligned}$$

	60	50	0	0	0	-M	0	-M
	x1	x2	s2	s4	s1	A1	s3	A2
50x2	40/3	0	1	0	0	2/3	0	-1/3
OS4	182/3	0	0	0	1	1/3	0	1/6
OS2	182/3	0	0	1	0	1/3	-1	1/3
60x1	40/3	1	0	0	0	-1/3	0	2/3
		0	0	0	0	40/3	M	90/3

$$\begin{aligned}
 54 - [-1/2 - 20/3 | 1] &= 182/3 \quad 54 - [-2 - 20/3 | 2] = 182/3 \quad 20 - [1/2 - 20/3 | 2] = 40/3 \\
 1200 - [20 - 20/3 | 2] &= 4400/3 \\
 s1: 0 - [1 - 1/2 | 3/2] &= 1/3 \quad 0 - [1 - 2/3 | 2] = 1/3 \quad 0 - [1 - 1/2 | 3/2] = -1/3 \\
 0 - [1 - 20/3 | 2] &= 40/3 \\
 s3: 3/2 - [1/2 - 1/2 | 3/2] &= 1/6 \quad 1 - [-2 - 1/2 | 3/2] = 2/3 \quad 30 - [1/2 - 20/3 | 2] = 70/3
 \end{aligned}$$

La tabla es optima resultado: 1400

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