

Ejercicios de prueba Programa AutomatizacionMetodosGranMYDosFases

Función Objetivo

Maximizar: $Z = 4X_1 + 5X_2 + 3X_3$

Sujeto a:

$1X_1 + 1X_2 + 1X_3 \leq 10$

$2X_1 + 3X_2 + 4X_3 = 15$

$1X_1 + 4X_2 + 2X_3 \geq 12$

$X_1, X_2, X_3 \geq 0$

Solución maximizar Dos fases

Tabla 3	C _j	4	5	3	0	0	
C _b	Base	X ₁	X ₂	X ₃	S ₁	S ₂	R
0	S ₁	0	0	-1	1	-1/5	17/5
4	X ₁	1	0	2	0	3/5	24/5
5	X ₂	0	1	0	0	-2/5	9/5
	Z	0	0	5	0	2/5	141/5

La solución óptima es $Z = 141/5$
 $X_1 = 24/5, X_2 = 9/5, X_3 = 0, S_1 = 17/5, S_2 = 0$

Solución óptima encontrada										
Z	X1	X2	X3	S1	A1	E1	A2		RHS	
Z	1.00	0.00	0.00	5.00	0.00	0.00	0.40	0.00	28.20	
S1	0.00	0.00	0.00	-1.00	1.00	0.00	-0.20	0.00	3.40	
X1	0.00	1.00	0.00	2.00	0.00	0.00	0.60	0.00	4.80	
X2	0.00	0.00	1.00	0.00	0.00	0.00	-0.40	0.00	1.80	

Anterior Paso 11 de 11 Siguiente

Solución Óptima

Variables de Decisión:

X1: 4.80 (Original)

X2: 1.80 (Original)

X3: 0.00 (Original)

Variables de Holgura:

S1: 5.80 (Holgura)

Función Obj... 28.20 (Maximizar)

Solución

Solución maximizar Gran M

Tabla 4	C _j	4	5	3	0	0	-M	-M	
C _b	Base	X ₁	X ₂	X ₃	S ₁	S ₂	A ₁	A ₂	R
0	S ₁	0	0	-1	1	-3/5	1/5	1/5	17/5
4	X ₁	1	0	2	0	3/5	4/5	-3/5	24/5
5	X ₂	0	1	0	0	-2/5	-1/5	2/5	9/5
	Z	0	0	5	0	3/5	M+11/5	M+2/5	141/5

La solución óptima es $Z = 141/5$
 $X_1 = 24/5, X_2 = 9/5, X_3 = 0, S_1 = 17/5, S_2 = 0, A_1 = 0, A_2 = 0$

Solución óptima encontrada										
Z	X1	X2	X3	S1	A1	E1	A2		RHS	
Z	1.00	0.00	0.00	5.00	0.00	1002.20	0.40	999.60	28.20	
S1	0.00	0.00	0.00	-1.00	1.00	-0.60	-0.20	0.20	3.40	
X1	0.00	1.00	0.00	2.00	0.00	0.80	0.60	-0.60	4.80	
X2	0.00	0.00	1.00	0.00	0.00	-0.20	-0.40	0.40	1.80	

Anterior Paso 9 de 9 Siguiente

Solución Óptima

Variables de Decisión:

X1: 4.80 (Original)

X2: 1.80 (Original)

X3: 0.00 (Original)

Variables de Holgura:

S1: 3.40 (Holgura)

Función Obj... 28.20 (Maximizar)

Solución

Solución Minimizar Dos Fases

Matriz Segunda Fase										
Tabla 1	C _j	4	5	3	0	0				
C _b	Base	X ₁	X ₂	X ₃	S ₁	S ₂				
0	S ₁	1/2	0	0	1	1/10	29/5			
3	X ₃	1/2	0	1	0	3/10	12/5			
5	X ₂	0	1	0	0	-2/5	9/5			
	Z	-5/2	0	0	0	-11/10	81/5			

La solución óptima es $Z = 81/5$
 $X_1 = 0, X_2 = 9/5, X_3 = 12/5, S_1 = 29/5, S_2 = 0, A_1 = 0, A_2 = 0$

Solución óptima encontrada										
Z	X1	X2	X3	S1	A1	E1	A2		RHS	
Z	-1.00	2.50	0.00	0.00	0.00	1.10	0.00	-16.20		
S1	0.00	0.50	0.00	0.00	1.00	0.00	0.10	0.00	5.80	
X3	0.00	0.50	0.00	1.00	0.00	0.30	0.00	2.40		
X2	0.00	0.00	1.00	0.00	0.00	-0.40	0.00	1.80		

Anterior Paso 9 de 9 Siguiente

Solución Óptima

Variables de Decisión:

X1: 0.00 (Original)

X2: 1.80 (Original)

X3: 2.40 (Original)

Variables de Holgura:

S1: 5.80 (Holgura)

Función Obj... 16.20 (Minimizar)

Solución

Solución minimizar Gran M

Iteración 2										
Tabla 3	C _j	4	5	3	0	0	M	M		
C _b	Base	X ₁	X ₂	X ₃	S ₁	S ₂	A ₁	A ₂		
0	S ₁	1/2	0	0	1	1/10	-1/5	-1/10	29/5	
3	X ₃	1/2	0	1	0	3/10	2/5	-3/10	12/5	
5	X ₂	0	1	0	0	-2/5	-1/5	2/5	9/5	
	Z	-5/2	0	0	0	-11/10	M+1/5	M+11/10	81/5	

La solución óptima es $Z = 81/5$
 $X_1 = 0, X_2 = 9/5, X_3 = 12/5, S_1 = 29/5, S_2 = 0, A_1 = 0, A_2 = 0$

Solución óptima encontrada										
Z	X1	X2	X3	S1	A1	E1	A2		RHS	
Z	-1.00	2.50	0.00	0.00	0.00	999.80	1.10	998.90	-16.20	
S1	0.00	0.50	0.00	0.00	1.00	-0.20	0.10	-0.10	5.80	
X3	0.00	0.50	0.00	1.00	0.00	0.40	0.30	-0.30	2.40	
X2	0.00	0.00	1.00	0.00	0.00	-0.20	-0.40	0.40	1.80	

Anterior Paso 7 de 7 Siguiente

Solución Óptima

Variables de Decisión:

X1: 0.00 (Original)

X2: 1.80 (Original)

X3: 2.40 (Original)

Variables de Holgura:

S1: 5.80 (Holgura)

Función Obj... 16.20 (Minimizar)

Solución

Ejemplo- Minimización

• Minimizar $Z=2x_1+3x_2$

S.a:

- (1) $x_1+3x_2\geq 9$
- (2) $2x_1+x_2\geq 8$
- $x_1,x_2\geq 0$

Minimizar Dos Fases

Initial Table - Phase II

Table 1	Cj	2	3	0	0	
Cb	Base	X1	X2	S1	S2	R
3	X2	0	1	-2/5	1/5	2
2	X1	1	0	1/5	-3/5	3
	Z	0	0	-4/5	-3/5	12

The optimal solution is Z = 12

X1= 3, X2= 2, S1= 0, S2= 0

Solucion

Minimizar Gran M

Iteration 2

Table 3	Cj	2	3	0	0	M	M	
Cb	Base	X1	X2	S1	S2	A1	A2	R
3	X2	0	1	-2/5	1/5	2/5	-1/5	2
2	X1	1	0	1/5	-3/5	-1/5	3/5	3
	Z	0	0	-4/5	-3/5	-M/5	M/5	12

The optimal solution is Z = 12

X1= 3, X2= 2, S1= 0, S2= 0, A1= 0, A2= 0

Copy link to share results

Solución óptima encontrada

Z	X1	X2	E1	A1	E2	A2	RHS
Z	-1.00	0.00	0.00	1.40	0.00	0.00	-12.00
X2	0.00	0.00	1.00	-0.20	0.00	0.00	2.00
X1	0.00	1.00	0.00	-0.40	0.00	0.00	3.00

Anterior

Paso 9 de 9

Siguiente

Solución Óptima

Variables de Decisión:

X1: 3.00 (Original)

X2: 2.00 (Original)

Función Obje... 12.00 (Minimizar)

Solución

Maximizar $Z=3x_1+2x_2$

S.a:

- (1) $x_1+ x_2 \leq 10$
- (2) $2x_1+3x_2 \geq 15$
- (3) $x_1 = 4$
- $x_1,x_2 \geq 0$

Dos Fases

Iteration 1

Table 2	Cj	3	2	0	0	
Cb	Base	X1	X2	S1	S2	R
0	S2	0	0	3	1	11
2	X2	0	1	1	0	6
3	X1	1	0	0	0	4
	Z	0	0	2	0	24

The optimal solution is Z = 24

X1= 4, X2= 6, S1= 0, S2= 11

Solución óptima encontrada

Z	X1	X2	S1	E1	A1	A2	RHS
Z	3.00	0.00	0.00	2.00	0.00	0.00	24.00
E1	0.00	0.00	0.00	3.00	1.00	0.00	11.00
X2	0.00	0.00	1.00	1.00	0.00	0.00	6.00
X1	0.00	1.00	0.00	0.00	0.00	0.00	4.00

Anterior

Paso 10 de 10

Siguiente

Solución Óptima

Variables de Decisión:

X1: 4.00 (Original)

X2: 2.33 (Original)

Variables de Exceso:

E1: 11.00 (Exceso)

Función Obje... 24.00 (Maximizar)

Solución

Gran M

Iteration 3

Table 4	Cj	3	2	0	0	-M	-M	
Cb	Base	X1	X2	S1	S2	A1	A2	R
0	S2	0	0	3	1	-1	-1	11
2	X2	0	1	1	0	0	-1	6
3	X1	1	0	0	0	0	1	4
	Z	0	0	2	0	M	M	24

The optimal solution is Z = 24

X1= 4, X2= 6, S1= 0, S2= 11, A1= 0, A2= 0

Solución óptima encontrada

Z	X1	X2	S1	E1	A1	A2	RHS
Z	3.00	0.00	0.00	2.00	0.00	1000.00	24.00
E1	0.00	0.00	0.00	3.00	1.00	-1.00	11.00
X2	0.00	0.00	1.00	1.00	0.00	0.00	6.00
X1	0.00	1.00	0.00	0.00	0.00	1.00	4.00

Anterior

Paso 8 de 8

Siguiente

Solución Óptima

Variables de Decisión:

X1: 4.00 (Original)

X2: 6.00 (Original)

Variables de Exceso:

E1: 11.00 (Exceso)

Función Obje... 24.00 (Maximizar)

Solución

Dos Fases

$$\text{Minimizar } Z = 4x_1 + 5x_2$$

S.a:

$$3x_1 + x_2 \leq 27$$

$$x_1 + x_2 = 12$$

$$6x_1 + 4x_2 \leq 60$$

Iteration 1

Table 2	C _j	4	5	0	0	
C _b	Base	X ₁	X ₂	S ₁	S ₂	R
0	S ₂	2	0	0	1	12
0	S ₁	2	0	1	0	15
5	X ₂	1	1	0	0	12
	Z	1	0	0	0	60

The optimal solution is Z = 60

X₁= 0, X₂= 12, S₁= 15, S₂= 12

Solución óptima encontrada

Z	X1	X2	S1	A1	S2	RHS
Z	1.00	1.00	0.00	0.00	0.00	60.00
S2	0.00	2.00	0.00	0.00	1.00	12.00
S1	0.00	2.00	0.00	1.00	0.00	15.00
X2	0.00	1.00	1.00	0.00	0.00	12.00

Anterior Paso 13 de 13 Siguiente

Solución Óptima

Variables de Decisión:

X1: 0.00 (Original)

X2: 12.00 (Original)

Variables de Holgura:

S1: 15.00 (Holgura)

S2: 12.00 (Holgura)

Función Objeto... 60.00 (Maximizar)

Solución

Gran M

Iteration 1

Table 2	C _j	4	5	0	0	M	
C _b	Base	X ₁	X ₂	S ₁	S ₂	A ₁	R
0	S ₁	1	0	1	0	-2	3
5	X ₂	1	1	0	0	1	12
0	S ₂	2	0	0	1	-4	12
	Z	1	0	0	0	M+5	60

The optimal solution is Z = 60

X₁= 0, X₂= 12, S₁= 3, S₂= 12, A₁= 0

Solución óptima encontrada

Z	X1	X2	S1	A1	S2	RHS
Z	1.00	1.00	0.00	0.00	1005.00	60.00
S1	0.00	2.00	0.00	1.00	-1.00	15.00
X2	0.00	1.00	1.00	0.00	1.00	12.00
S2	0.00	2.00	0.00	0.00	-4.00	12.00

Anterior Paso 4 de 4 Siguiente

Solución Óptima

Variables de Decisión:

X1: 0.00 (Original)

X2: 12.00 (Original)

Variables de Holgura:

S1: 15.00 (Holgura)

S2: 12.00 (Holgura)

Función Objeto... 60.00 (Maximizar)

Solución

Desafío 3

$$\text{Minimizar } W = x_1 + 3x_2,$$

sujeto a:

$$(1) x_1 + 2x_2 \geq 8,$$

$$(2) 3x_1 + x_2 \leq 7,$$

$$(3) x_1 - x_2 = 2,$$

$$x_1, x_2 \geq 0.$$

Dos Fases

Iteration 3

Table 4	C _j	0	0	0	0	1	1	
C _b	Base	X ₁	X ₂	S ₁	S ₂	A ₁	A ₂	R
1	A ₂	0	0	-4/5	-3/5	4/5	1	21/5
0	X ₂	0	1	-3/5	-1/5	3/5	0	17/5
0	X ₁	1	0	1/5	2/5	-1/5	0	6/5
	Z	0	0	-4/5	-3/5	-1/5	0	21/5

The iterations of the first phase have been completed and there are artificial variables in the base with values strictly greater than 0, so the problem has no solution (Infeasible).

Base actualizada para la fase dos

Entrada: , Salida:

	Z	X1	X2	E1	A1	S1	A2	RHS
Z	-1.00	0.00	0.00	2.40	0.00	0.80	0.00	-15.60
R1	0.00	0.00	0.00	-0.80	0.00	-0.60	0.00	4.20
X2	0.00	0.00	1.00	-0.60	0.00	-0.20	0.00	3.40
X1	0.00	1.00	0.00	0.20	0.00	0.40	0.00	1.20

Anterior Paso 10 de 10 Siguiente

Solución

Gran M

Iteration 3

Table 4	C _j	1	3	0	0	M	M	
C _b	Base	X ₁	X ₂	S ₁	S ₂	A ₁	A ₂	R
M	A ₂	0	0	-4/5	-3/5	4/5	1	21/5
3	X ₂	0	1	-3/5	-1/5	3/5	0	17/5
1	X ₁	1	0	1/5	2/5	-1/5	0	6/5
	Z	0	0	-4/5M+1/5	-3/5M+1/5	-1/5M+1/5	0	21/5M+1/5

The iterations have been completed and there are artificial variables in the base with values strictly greater than 0, so the problem has no solution (Infeasible).

No tiene solución, hay artificiales en la base

	Z	X1	X2	E1	A1	S1	A2	RHS
Z	-1.00	0.00	0.00	800001.6	199998.4	600000.2	0.00	-4200011
A2	0.00	0.00	0.00	-0.80	0.80	-0.60	1.00	4.20
X2	0.00	0.00	1.00	-0.60	0.60	-0.20	0.00	3.40
X1	0.00	1.00	0.00	0.20	-0.20	0.40	0.00	1.20

Anterior Paso 8 de 8 Siguiente