

PROGRAMACION LINEAL

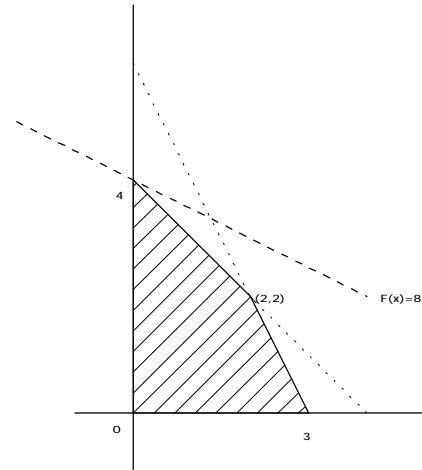
Identificación de las soluciones con GAMS

$$\text{Max } F(x) = x_1 + 2 x_2$$

$$\text{s.a: } x_1 + x_2 \leq 4$$

$$2 x_1 + x_2 \leq 6$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



*EJEMPLO N-1

*POLIEDRO - VERTICE

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= X1 + 2*X2;

R1.. X1 + X2 =L= 4;

R2.. 2*X1 + X2 =L= 6;

MODEL EJEM1 /ALL/;

SOLVE EJEM1 USING LP MAXIMIZING F;

Solución:

EXIT -- OPTIMAL SOLUTION FOUND

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	4.000	4.000	2.000
---- EQU R2	-INF	4.000	6.000	.
	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	.	+INF	-1.000
---- VAR X2	.	4.000	+INF	.
---- VAR F	-INF	8.000	+INF	.

**** REPORT SUMMARY :

0 NONOPT

0 INFEASIBLE

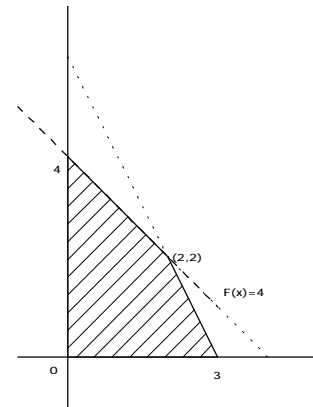
0 UNBOUNDED

$$\text{Max } F(x) = x_1 + x_2$$

$$\text{s.a: } x_1 + x_2 \leq 4$$

$$2x_1 + x_2 \leq 6$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



*EJEMPLO N-2

*POLIEDRO - ARISTA

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= X1 + X2;

R1.. X1 + X2 =L= 4;

R2.. 2*X1 + X2 =L= 6;

MODEL EJEM2 /ALL/;

SOLVE EJEM2 USING LP MAXIMIZING F;

Solución:

EXIT -- OPTIMAL SOLUTION FOUND

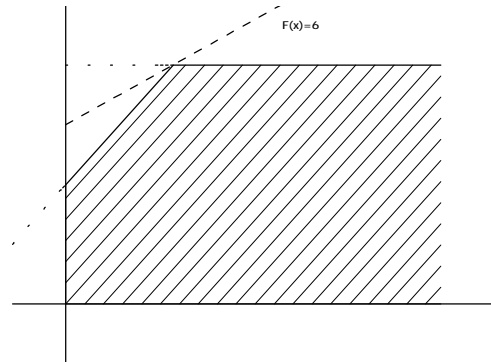
	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	4.000	4.000	1.000
---- EQU R2	-INF	4.000	6.000	.
	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	.	+INF	EPS (ENTRA)
---- VAR X2	.	4.000	+INF	.
---- VAR F	-INF	4.000	+INF	.
**** REPORT SUMMARY :	0	NONOPT		
	0	INFEASIBLE		
	0	UNBOUNDED		

$$\text{Max } F(x) = -x_1 + 2x_2$$

$$\text{s.a: } -x_1 + x_2 \leq 2$$

$$x_2 \leq 4$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



*EJEMPLO N-3

*POLITOPO - VERTICE

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= -X1 + 2*X2;

R1.. - X1 + X2 =L= 2;

R2.. X2 =L= 4;

MODEL EJEM3 /ALL/;

SOLVE EJEM3 USING LP MAXIMIZING F;

Solución:

EXIT -- OPTIMAL SOLUTION FOUND

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	2.000	2.000	1.000
---- EQU R2	-INF	4.000	4.000	1.000

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	2.000	+INF	.
---- VAR X2	.	4.000	+INF	.
---- VAR F	-INF	6.000	+INF	.

**** REPORT SUMMARY :

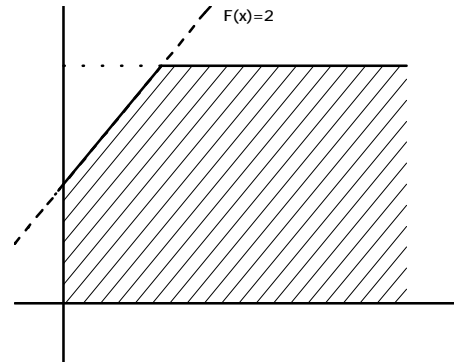
0	NONOPT
0	INFEASIBLE
0	UNBOUNDED

$$\text{Max } F(x) = -x_1 + x_2$$

$$\text{s.a: } -x_1 + x_2 \leq 2$$

$$x_2 \leq 4$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



*EJEMPLO N-4

*POLITOPO - ARISTA

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= -X1 + X2;

R1.. - X1 + X2 =L= 2;

R2.. X2 =L= 4;

MODEL EJEM4 /ALL/;

SOLVE EJEM4 USING LP MAXIMIZING F;

EXIT -- OPTIMAL SOLUTION FOUND

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	2.000	2.000	1.000
---- EQU R2	-INF	2.000	4.000	.
	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	.	+INF	EPS (ENTRA)
---- VAR X2	.	2.000	+INF	.
---- VAR F	-INF	2.000	+INF	.

**** REPORT SUMMARY :

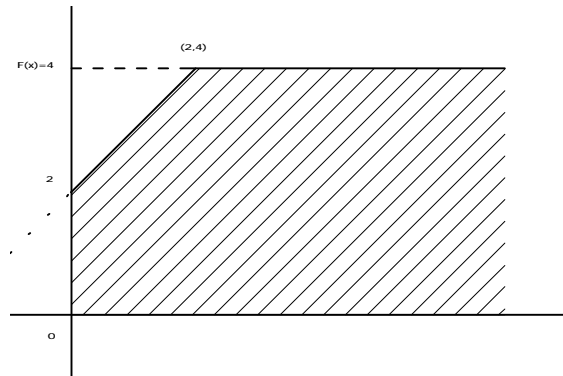
0	NONOPT
0	INFEASIBLE
0	UNBOUNDED

$$\text{Max } F(x) = x_2$$

$$\text{s.a: } -x_1 + x_2 \leq 2$$

$$x_2 \leq 4$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



*EJEMPLO N-5

*POLITOPO - ARISTA INFINITA

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= X2;

R1.. - X1 + X2 =L= 2;

R2.. X2 =L= 4;

MODEL EJEM5 /ALL/;

SOLVE EJEM5 USING LP MAXIMIZING F;

EXIT -- OPTIMAL SOLUTION FOUND

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	2.000	2.000	<i>EPS (ENTRA)</i>
---- EQU R2	-INF	4.000	4.000	<i>1.000</i>

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	2.000	+INF	.
---- VAR X2	.	4.000	+INF	.
---- VAR F	-INF	4.000	+INF	.

**** REPORT SUMMARY :

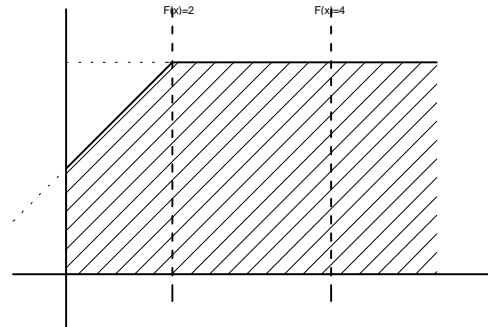
0	NONOPT
0	INFEASIBLE
0	UNBOUNDED

$$\text{Max } F(x) = x_1$$

$$\text{s.a: } -x_1 + x_2 \leq 2$$

$$x_2 \leq 4$$

$$x_1 \geq 0 \quad x_2 \geq 0$$



***EJEMPLO N-6**

*** NO ACOTADO**

VARIABLES X1, X2, F;

POSITIVE VARIABLES X1, X2;

EQUATIONS

OBJ, R1, R2;

OBJ.. F =E= X1;

R1.. - X1 + X2 =L= 2;

R2.. X2 =L= 4;

MODEL EJEM6 /ALL/;

SOLVE EJEM6 USING LP MAXIMIZING F;

EXIT -- THE PROBLEM IS UNBOUNDED (OR BADLY SCALED).

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	1.000
---- EQU R1	-INF	2.000	2.000	-1.000 UNBND
---- EQU R2	-INF	4.000	4.000	1.000

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	2.000	+INF	.
---- VAR X2	.	4.000	+INF	.
---- VAR F	-INF	2.000	+INF	.

**** REPORT SUMMARY :

0	NONOPT
0	INFEASIBLE
1	UNBOUNDED (UNBND)

Max $F(x) = x_1 + x_2$

s.a: $-x_1 + 2x_2 \leq 4$

$-2x_1 + x_2 \geq 4$

$x_1 \geq 0 \quad x_2 \geq 0$

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*EJEMPLO N-7
* INFACTIBLE
VARIABLES
X1, X2, F;
POSITIVE VARIABLES X1, X2;
EQUATIONS
OBJ, R1, R2;
OBJ..      F =E=  X1 + X2 ;
R1..      - X1 + 2*X2 =L= 4;
R2..      -2*X1 + X2 =G= 4;
MODEL EJEM7 /ALL/;
SOLVE EJEM7 USING LP MAXIMIZING F;

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EXIT -- THE PROBLEM IS INFEASIBLE

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU OBJ	.	.	.	EPS
---- EQU R1	-INF	4.000	4.000	-0.250
---- EQU R2	4.000	2.000	+INF	. INFES

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR X1	.	.	+INF	0.750
---- VAR X2	.	2.000	+INF	.
---- VAR F	-INF	2.000	+INF	.


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**** REPORT SUMMARY :      0      NONOPT
                        1 INFEASIBLE ( INFES)
SUM      2.000
MAX      2.000
MEAN     2.000
                        0 UNBOUNDED

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