

2024/2021

الاجابة النموذجية لامتحان programmation lineaire

المعلم
علاء الدين

Exo 1:

1) Max $W = -a_1 - a_2$

$2x_1 + x_2 + e_1 = 5$

$x_1 + a_1 = 1$

$x_2 + x_2 - e_2 + a_2 = 4$

$x_1, x_2, e_1, e_2 \geq 0$

$a_1, a_2 \geq 0$

VB : e_1, a_1, a_2

VHB: x_1, x_2, e_2

$W = -a_1 - a_2$

$-a_1 = x_1 - 1$

$-a_2 = x_1 + x_2 - e_2 - 4$

$\Rightarrow W - 2x_1 - x_2 + e_2 = -5$

	x_1	x_2	e_1	e_2	a_1	a_2	b
e_1	2	1	1	0	0	0	5
a_1	1	0	0	0	1	0	1
a_2	1	1	0	-1	0	1	4
D_j	-2	-1	0	1	0	0	-5

	x_1	x_2	e_1	e_2	a_1	a_2	b
e_1	0	1	1	0	-2	0	3
x_1	1	0	0	0	1	0	1
a_2	0	1	0	-1	-1	1	3
D_j	0	-1	0	1	2	0	-3

	x_1	x_2	e_1	e_2	a_1	a_2	b
e_1	0	0	1	1	-1	-1	0
x_1	1	0	0	0	1	0	1
x_2	0	1	0	-1	-1	1	3
D_j	0	0	0	0	1	1	0

tous $\Delta_j \geq 0$ et $W = 0$ donc Z admet une SBR

VB: e_1, x_1, x_2 $Z = 2x_1 + x_2$
 VHB: e_2 $x_1 = 1 \Rightarrow Z = 2 + x_2$
 $x_2 - e_2 = 3$
 $-2 - x_{e_2} = 17$

	x_1	x_2	e_1	e_2	b
e_1	0	0	1	1	0
x_1	1	0	0	0	1
x_2	0	1	0	-1	3
	0	0	0	-1	17

	x_1	x_2	e_1	e_2	b
e_2	0	0	1	1	0
x_1	1	0	0	0	1
x_2	0	1	1	0	3
	0	0	1	0	17

tous $\Delta_j \geq 0$
 $Z = 17$
 $x_1 = 1$
 $x_2 = 3$

2) Représentation graphique

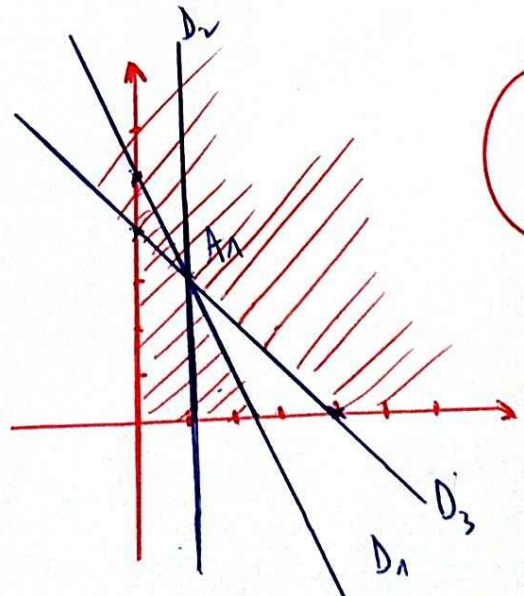
$2x_1 + x_2 = 5$ $(0, 5)$ $(2.5, 0)$

$x_1 = 1$

$x_1 + x_2 = 4$ $(0, 4)$ $(4, 0)$

le seul point d'intersection est

$A_1(1, 3)$ donc $Z^* = 17$
 $x_1 = 1$
 $x_2 = 3$



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Exo 2:
1) On pose x_1 le nbre de sac P_1 $(0,1)$
 x_2 le nbre de sac P_2 $(0,1)$

$$\text{Min } Z = 100x_1 + 200x_2 \quad (0,1)$$

$$3x_1 + x_2 \geq 9 \quad (0,1)$$

$$x_1 + x_2 \geq 6 \quad (0,1)$$

$$x_1 + 4x_2 \geq 12 \quad (0,1)$$

$$x_1 \geq 0, x_2 \geq 0 \quad (0,1)$$

2) Dual $\text{Max } W = 9y_1 + 6y_2 + 12y_3 \quad (0,1)$

$$3y_1 + y_2 + y_3 \leq 100 \quad (0,1)$$

$$y_1 + y_2 + 4y_3 \leq 200 \quad (0,1)$$

$$y_1 \geq 0, y_2 \geq 0, y_3 \geq 0 \quad (0,1)$$