TP1

C1

C2

C3

Z=(MAX) 20x+40y+25z

X=nbr C1

y=nbr C2

z=nbr C3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | A1(tps en s) | A2 | A3 | A1(tps en s) | A2(cout) | A3(cout) | Or(mg) | Vente |
| C1 | 3 | 2 | 1 | 3.5 | 4 | 7 | 20 | 20 |
| C2 | 2 | 2 | 2 | 5 | 9 | 23 | 40 | 40 |
| C3 | 1 | 1 | 3 | 4 | 5 | 8 | 80 | 25 |

1mg or = 0.025(€)

Achat or <25000

nbC1>(C1+C2+C3)/2

A3 :2/3 tps

24h=(24\*60\*60)s

Quantité or= 20X + 40y + 80z

Cout or= (20X + 40y + 80z)\* 0,025

Temps A1(s) = 3x+2y+z

Temps A2(s) = 2x+2y+z

Temps A3(s) = x+2y+3z

Cout traitement A1=3.5x+5y+4z

Cout traitement A2=4x+9y+5z

Cout traitement A3=7x+23y+8z

Cout traitement = 14.5x+37y+17z

Vente C1=20x

Vente C2=40y

Vente C3=25z

Vente composant = 10x+40y+25z

Contraintes :

(20X + 40y + 80z)\* 0,025 < 25000

A3=2/3 temps

Temps A1(s) = 3x+2y+z < (24\*60\*60)

Temps A2(s) = 2x+2y+z < (24\*60\*60)

Temps A3(s) = x+2y+3z < (24\*60\*60) \* 2/3

x>(x+y+z)/2

Z(max)= - Cout traitement + vente composant-cout or

20x+40y+25z – (14.5x+37y+17z)-((20X + 40y + 80z)\* 0,025)

20x+40y+25z – (14.5x+37y+17z)-(0.5X + 1y + 2z)

Z(max)= -5x+2y+6z

Contraintes temps :

3x+2y+z <86400

2x+2y+z <86400

x+2y+3z<57600

contrainte or :

(0.5x+y+2z < 25000

Contrainte fabrication :

x>(x+y+z)/2

Maximize p = -5x + 2y + 6z subject to

3x + 2y + z <=86400

2x+2y+z <86400

x+2y+3z<57600

0.5x+y+2z < 25000

x>(x+y+z)/2

x/2 + y/2 + z/2 < x

-x/2 … <0

Maximize p = (-5)x + 2y + 6z subject to

3x + 2y + z <=86400

2x + 2y + z <=86400

x + 2y + 3z <=57600

(1/2)x + y + 2z <= 25000

(-1/2)x + (1/2)y +(1/2)z <= 0

Resultats à trouver :

Exo1 :

Avec options « décimal » + « rounding=6 »

Z\*=169055

X1=26872,7

X2=0

X3=5781.82

Ex2 :

Z\*=23181.8

X1=40/11

X2=350/66

Ex3 :

Z\*=3860

X1=5.8

X2=1.2

Ex4 :

Z\*=56880

X=18

Y=0

Z=58

Ex5 :

Proglinéaire en nbres entiers

Méthode « branch and bound »

Z\*=100

X1=34

X2=33

Ex6 :

« branch an bound »

Z\*=15

X1=x2=3

Soluce :

Maximize p = 5x + 2y + 6z subject to

3x + 2y + z <=86400

2x + 2y + z <=86400

x + 2y + 3z <=57600

(1/2)x + y + 2z <= 25000

(-1/2)x + (1/2)y +(1/2)z <= 0

La contrainte

2x + 2y + z <=86400

Car on a déjà

3x + 2y + z <=86400.

On obtient bien le même résultat avec cette contrainte que sans.

Q4

On obtient la même chose

Exo 3

Na=nbre de A

Nb = nbre de B

Cout=500\*Na+800\*nb

X=100(kg)=1

Y=140(kg)=1.4

Z=150(kg)=1.5

T=240(kg)=2.4

A\*0.1+B\*3.5 >=1

A\*0.2+B\*0.2 >= 1.4

A\*0.3+B\*1.5 >= 1.5

A\*0.4 + B\*0.3 >=2.4

Min(500\*Na+800\*nb)

Minimize p = 500x + 800y subject to

x\*0.1+y\*0.35 >=1

x\*0.2+y\*0.2 >= 1.4

x\*0.3+y\*0.15 >= 1.5

x\*0.4 + y\*0.3 >=2.4

Minimize p = 500x + 800y subject to

x\*10 + y\*35 >= 100

x\*20 + y\*20 >= 140

x\*30 + y\*15 >= 150

x\*40 + y\*30 >= 240

soluce:

Minimize p = 500x + 800y subject to

10x + 35y >= 100

20x + 20y >= 140

30x + 15y >= 150

40x + 30y >= 240

Exo 5:

maxZ a 2b

40a 20b ≤3000

50a ≤3100

20a 40b ≤2000

30b ≤1000

Maximize p = x + 2y subject to

40x + 20y <= 3000

50x + 0y <= 3100

20x + 40y <= 2000

0x+30y <= 1000

Optimal Solution: p = 100; x = 33.3333, y = 33.3333

Maximize p = x + 2y subject to

40x + 20y <= 3000

50x + 0y <= 3100

20x + 40y <= 2000

0x+30y <= 1000

X<=33

Optimal Solution: p = 99.6667; x = 33, y = 33.3333

Maximize p = x + 2y subject to

40x + 20y <= 3000

50x + 0y <= 3100

20x + 40y <= 2000

0x+30y <= 1000

X>=34

Optimal Solution: p = 100; x = 34, y = 33

Exo6 :

It 1 :

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

Optimal Solution: p = 17.6774; x = 1.54839, y = 4.03226

It 2.1

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=4

Optimal Solution: p = 17.6; x = 1.6, y = 4

It 2.2

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y>=5

No optimal solution exists for this problem.

It 3.1

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=4

x<=1

Optimal Solution: p = 15.6667; x = 1, y = 3.66667

It 3.2

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=4

x>=2

Optimal Solution: p = 17; x = 2, y = 3.75

It 4.1

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=3

x>=2

Optimal Solution: p = 15.2; x = 3.2, y = 3

It 4.2

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=3

x>=3

Optimal Solution: p = 15.2; x = 3.2, y = 3

No optimal solution exists for this problem.

It 5.1

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=3

x>=2

x >=4

Optimal Solution: p = 14; x = 4, y = 2.5

Maximize p = x + 4y subject to

5x + 8y <= 40

-2x + 3y <= 9

y<=3

x>=2

x <=3

Optimal Solution: p = 15; x = 3, y = 3