

B additivity

- no interaction among activities
- no complementary impact
- no competitiveness

C divisibility

- continuous decision variables

D certainty

- fixed parameters and relationship

E non-negativity

- no negative value

F sensitivity test

- compensate for the violation of these assumptions.

G basic questions to be addressed

- required operations
- operations requirements / limitations
- decision variables
- object function
- constraints

Example : A firm to produce two products. There will be two machines for each production process.

We need to determine production quantity to maximize total profit.

product \ machine	1	2	limit
A	4	1	60
B	2	2	48
profit	5	4	

$$\begin{aligned} \text{Max } & 5X_1 + 4X_2 \\ \text{st } & 4X_1 + X_2 \leq 60 \\ & 2X_1 + 2X_2 \leq 48 \\ & X_1, X_2 \geq 0 \end{aligned}$$

sol : operation - to produce 1

- to produce 2

resource required - machine A : 60 units

machine B : 48 units

decision variables - x_1 : no. of units produced for product 1

x_2 : no. of units produced for product 2

objective function coefficient (o.f.c.) - $C_1=5$

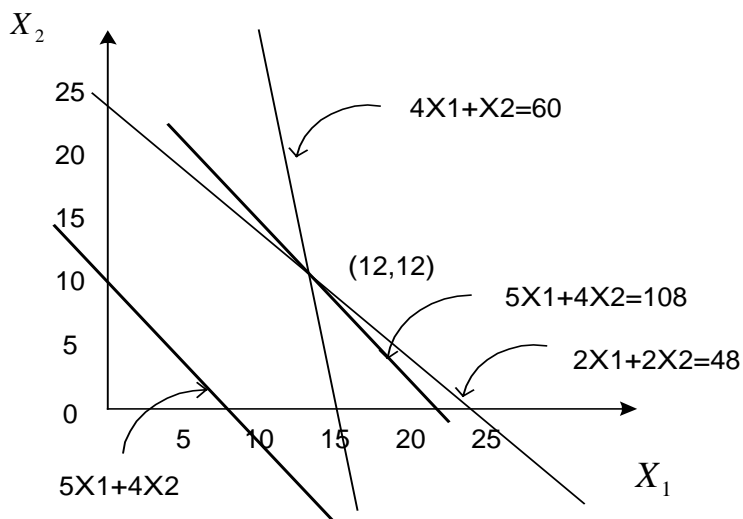
$$C_2=4 \quad \text{Max } 5X_1 + 4X_2$$

constraint - $a_{11} = 4$, $a_{12} = 1$

$$a_{21} = 2$$
 , $a_{22} = 2$

$$\text{st } \begin{cases} 4X_1 + X_2 \leq 60 \\ 2X_1 + 2X_2 \leq 48 \end{cases}$$

non-negativity - $X_1, X_2 \geq 0$



3.4 LP Graphical Method

- for two – dimension problem
- graphical solution procedure

step 1 : develop a graph for possible solutions

step 2 : identify the feasible region

step 3 : draw a objective function line

step 4 : move the OFL parallel until the line will reach infeasible region

step 5 : identify optimal solution