

SIMPLEX METHOD-1

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$$

one B

$$5C_3 = 10$$

basic soln. get 1

you can get other basic solns.

5 are there

rest are infeasible.

$$\begin{aligned} 2x_1 + 5x_2 &= 8 \quad A-2 \\ 2x_1 + x_2 &= 4 \end{aligned}$$

$$\begin{aligned} 10x_2 &= 4 \\ -x_2 &= 1.6 \end{aligned}$$

$$9x_2 = 1.6$$

$$x_2 = \frac{1.6}{9}$$

$$x_2 = \frac{2}{3}$$

$$2x_1 = 4 - \frac{2}{3}$$

$$x_1 = 2 - \frac{1}{3} = \frac{5}{3}$$

$$\begin{bmatrix} 1 & 5 & 1 & 0 \\ 2 & 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

$$x_3 = 5, \quad x_4 = 4$$

$$x_1 = 0, \quad x_2 = 0$$

$$\begin{bmatrix} 1 & 5 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix} \Rightarrow (5/3, 2/3)$$

$$\begin{bmatrix} 5 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

$$5x_2 + x_3 = 5$$

$$x_2 = 4$$

$$20 + x_3 = 5$$

$$x_3 = -15$$

not
feasible.

$$\begin{bmatrix} x_p \\ 0 \end{bmatrix} = \theta \begin{bmatrix} \frac{b}{0} \\ 0 \end{bmatrix} + (1-\theta) \begin{bmatrix} \frac{a}{0} \\ 0 \end{bmatrix}$$

Choose basic variable.

Solve $Bx = b$.

$(n+m) C_m$ times.

Simplex algorithm

go from ~~edge~~ vertex to v . as long as you get better soln.

and 1 var to B , remove 1.

$$x_3 = 1 + x_1 - x_2$$

$$x_1 \geq 0$$

$$x_4 = 3 - x_1$$

$$x_2 \geq 1$$

$$x_5 = 2 - x_2$$

=

bring x_2 to B .

$$x_2 = 1 + x_1 - x_3$$

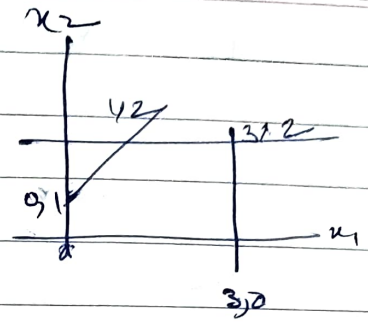
$$x_4 = 3 - x_1$$

$$x_5 = 2 - (1 + x_1 - x_3)$$

$$= 1 - x_1 + x_3$$

$$z = -x_1 - (1 + x_1 - x_3)$$

$$= -1 - 2x_1 + x_3$$



$$B = \{x_2, x_4, x_5\}.$$

$$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 3 \\ 2 \end{bmatrix}$$

$$z = -1$$

$$x \leq 1$$

bring x_1 to B.

$$x_1 = 1 + x_3 - x_5$$

$$x_2 = 2 - x_5$$

$$x_4 = 2 - x_3 + x_5$$

$$z = -1 - 2(1 + x_3 - x_5) + x_3$$

$$= -3 - x_3 + 2x_5$$

$$B = \{x_2, x_3, x_5\}$$

bring x_3 to B

$$x_3 = 2 - x_4 + x_5$$

$$x_1 = 3 - x_4$$

$$x_2 = 2 - x_5$$

$$Z = -5 + x_4 + x_5$$

$Z = -5$. \hookrightarrow no possibility of further improves objective

$$\underline{Z = -5}$$

x_1	3
x_2	2
x_3	2

0
0
5