ASSIGNMENT-10

A.TEJASRI

Download all python codes from

https://github.com/tejasri3657/Assignment−10/blob/main/Assignment_10.py

and latex-tikz codes from

https://github.com/tejasri3657/Assignment−10/new/main

1 QUESTION No-2.51(Inequalities)

Solve: x+y ≤ 6, x+y ≥ 4,

2 Solution

Let

$$\begin{aligned} -x - y &\geq -6, \\ x + y &\geq 4. \end{aligned} \tag{2.0.1}$$

Let $u_1 \geq 0, u_2 \geq 0$. This may be expressed as

$$\mathbf{u} = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \geq \mathbf{0} \tag{2.0.2}$$

Now we have,

$$\begin{pmatrix} -1 & -1 \\ 1 & 1 \end{pmatrix} \mathbf{x} \geq \begin{pmatrix} -6 \\ 4 \end{pmatrix} + \mathbf{u} \tag{2.0.3}$$

$$\mathbf{x} = \begin{pmatrix} -1 & -1 \\ 1 & 1 \end{pmatrix}^{-1} \begin{pmatrix} -6 \\ 4 \end{pmatrix} + \begin{pmatrix} -1 & -1 \\ 1 & 1 \end{pmatrix}^{-1} \mathbf{u} \tag{2.0.4}$$

$$\mathbf{x} = \frac{-1}{0} \begin{pmatrix} -6 \\ 4 \end{pmatrix} + \frac{-1}{0} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \mathbf{u} \tag{2.0.5}$$

$$\mathbf{x} = \begin{pmatrix} \frac{6}{0} \\ \frac{-4}{0} \end{pmatrix} + \frac{-1}{0} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \mathbf{u} \tag{2.0.6}$$

Thus the solution of the system of inequalities can be determined graphically.Which is represented in the below figure 2.0.1

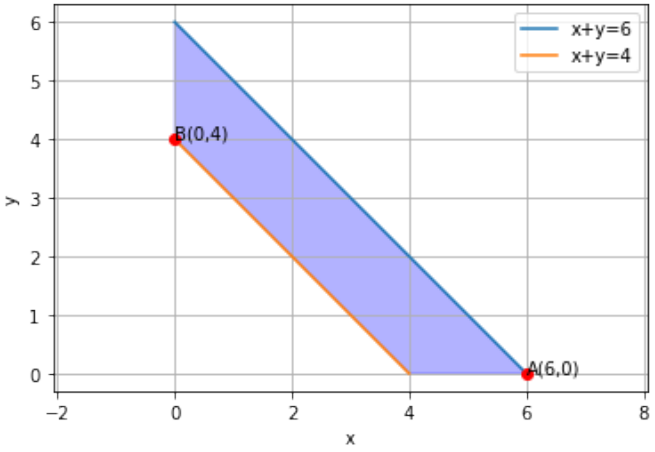

Fig. 2.1: Graphical solution