ASSIGNMENT-10

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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 -x-y ≥ -6,x+y ≥ 4. Let $u_1 \geq 0, u_2 \geq 0$. This may be expressed as

$$\mathbf{u} = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \geq \mathbf{0} \tag{2.0.1}$$

Now we have,

$$\begin{pmatrix} -1 & -1 \\ 1 & 1 \end{pmatrix} \mathbf{x} \geq \begin{pmatrix} -6 \\ 4 \end{pmatrix} + \mathbf{u} \tag{2.0.2}$$

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

$$\mathbf{x} = \frac{-1}{0} \begin{pmatrix} -6 \\ 4 \end{pmatrix} + \frac{-1}{0} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \mathbf{u} \tag{2.0.4}$$

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

Shade the region which does not contain origin. Now, highlight the common region found by both the inequations. Hence, solution of given inequations is highlighted area (“solution region”) including the points on the lines. Thus the solution of the system of inequalities can be determined graphically.Which is represented in the below figure,

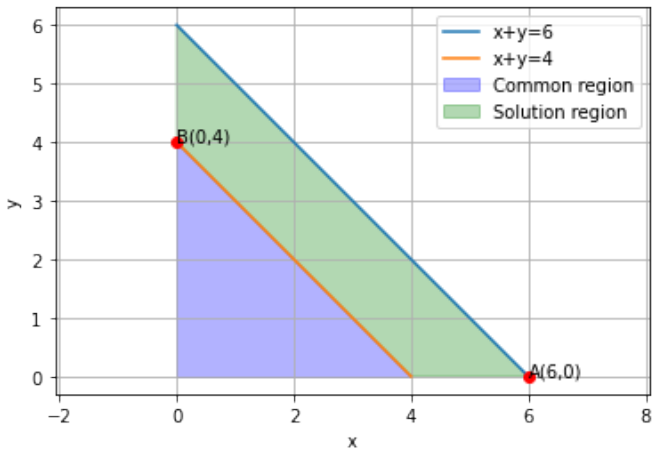

Fig. 2.1: Graphical solution