ASSIGNMENT-10

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Download all python codes from

https://github.com/Gayathri1729/SRFP/tree/main/Assignment10

and latex-tikz codes from

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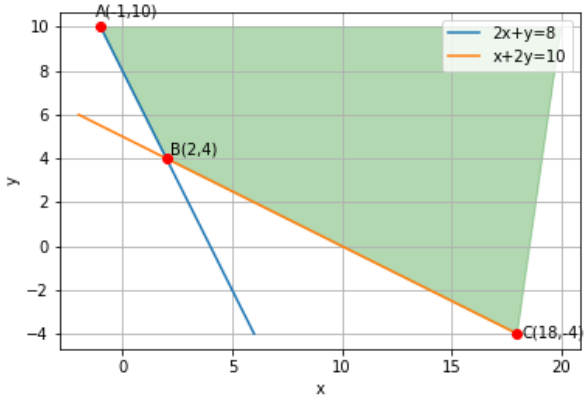

Fig. 2.1: Graphical solution

1 INEQUALITIES 2.52

Solve: 2x+y ≥ 8, x+2y ≥ 10.

2 SOLUTION

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

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

From the given inequalities we have,

$$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \mathbf{x} \geq \begin{pmatrix} 8 \\ 10 \end{pmatrix} \tag{2.0.2}$$

$$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \mathbf{x} - \mathbf{u} = \begin{pmatrix} 8 \\ 10 \end{pmatrix} \tag{2.0.3}$$

Now we have,

$$\mathbf{x} = \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}^{-1} \begin{pmatrix} 8 \\ 10 \end{pmatrix} + \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}^{-1} \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \tag{2.0.4}$$

$$\mathbf{x} = \begin{pmatrix} 2 \\ 4 \end{pmatrix} + \frac{1}{3} \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \tag{2.0.5}$$

Thus the solution of the system of inequalities can be determined graphically and is represented in the figure 2.1,