Assignment No.7

Valli Devi Bolla

Download all python codes from

https://github.com/Vallidevibolla/Assignment−7/blob/main/code.py

and latex-tikz codes from

https://github.com/Vallidevibolla/Assignment−7/blob/main/main.tex

Question taken from

https://github.com/gadepall/ncert/blob/main/linalg/optimization/gvv_ncert_opt.pdf−Q.no.2.11

1 Question 2.11

Maximise

$$Z = x + y \tag{1.0.1}$$

subject to

$$x - y \le -1 \tag{1.0.2}$$
$$x + y \le 0 \tag{1.0.3}$$
$$x \ge 0 y \ge 0 \tag{1.0.4}$$

2 Solution

This can be solved in python which generates the result as shown in plot

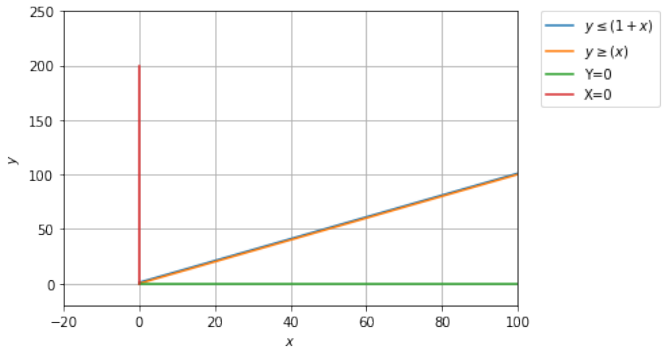

Fig. 0: Plot from python code

The given problem can be expressed in general as matrix inequality as:

$$\max_{\{x\}} \mathbf{c}^T \mathbf{x} \tag{2.0.1}$$
$$s.t \quad \mathbf{A}\mathbf{x} \le \mathbf{b} \tag{2.0.2}$$
$$\mathbf{x} \ge 0 \tag{2.0.3}$$
$$\mathbf{y} \ge 0 \tag{2.0.4}$$

where,

$$\mathbf{c} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \tag{2.0.5}$$
$$\mathbf{A} = \begin{pmatrix} 1 & -1 \\ -1 & 1 \end{pmatrix} \tag{2.0.6}$$
$$\mathbf{b} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} \tag{2.0.7}$$

Solving for Z by this reduction method we get

$$MaxZ = None \tag{2.0.8}$$

There is no optimal maximum solution for this.