

# Assignment No.7

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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](https://github.com/gadepall/ncert/blob/main/linalg/optimization/gvv_ncert_opt.pdf)–Q.no.2.11

## 1 QUESTION 2.11

Maximise

$$Z = x + y \quad (1.0.1)$$

subject to

$$x - y \leq -1 \quad (1.0.2)$$

$$x + y \leq 0 \quad (1.0.3)$$

$$x \geq 0, y \geq 0 \quad (1.0.4)$$

## 2 SOLUTION

Using (1.0.2) and (1.0.1) perform Langrangian multiplier method

$$f(x) = \lambda g(x) \quad (2.0.1)$$

$$f(x) = 1, g(x) = 1 \quad (2.0.2)$$

$$f(y) = 1, g(y) = -1 \quad (2.0.3)$$

Substituting the values in (2.0.10), we get

$$x = \lambda \quad (2.0.4)$$

$$y = -\lambda \quad (2.0.5)$$

Using the constraint (1.0.2)

$$\frac{x}{y} = \frac{\lambda}{-\lambda} \quad (2.0.6)$$

$$\Rightarrow x = -y \quad (2.0.7)$$

By substituting x value in (1.0.2), we get y value

$$y = \frac{1}{2} \quad (2.0.8)$$

Then the value of  $\lambda$  is given as

$$\lambda = x \Rightarrow \lambda = \frac{-1}{2} \quad (2.0.9)$$

Similarly using (1.0.1) and (1.0.3)

$$f(x) = \lambda g(x) \quad (2.0.10)$$

$$f(x) = 1, g(x) = -1 \quad (2.0.11)$$

$$f(y) = 1, g(y) = 1 \quad (2.0.12)$$

Substituting the values in (2.0.10), we get

$$x = -\lambda \quad (2.0.13)$$

$$y = \lambda \quad (2.0.14)$$

Finally we get Z=0 with

$$x = \frac{-1}{2} \quad (2.0.15)$$

$$y = \frac{1}{2} \quad (2.0.16)$$

$$MaxZ = None \quad (2.0.17)$$

There is no optimal maximum solution for this.

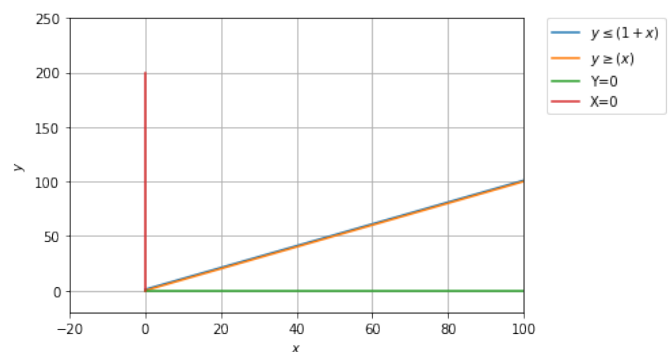


Fig. 0: Graphical solution