# Assignment No.7

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Download all python codes from

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

and latex-tikz codes from

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

Question taken from

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| 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

$$x - y \leq -1 \tag{1.0.2}$$
$$x + y \leq 0 \tag{1.0.3}$$
$$x \geq 0 y \geq 0 \tag{1.0.4}$$

## 2 Solution

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

$$f\left(x\right) = \lambda g\left(x\right) \tag{2.0.1}$$
$$f\left(x\right) = 1, g\left(x\right) = 1 \tag{2.0.2}$$
$$f\left(y\right) = 1, g\left(y\right) = -1 \tag{2.0.3}$$

Substituting the values in (2.0.10), we get

$$\mathbf{x} = \lambda \tag{2.0.4}$$
$$\mathbf{y} = -\lambda \tag{2.0.5}$$

Using the constraint (1.0.2)

$$\frac{x}{y} = \frac{\lambda}{-\lambda} \tag{2.0.6}$$
$$\implies \mathbf{x} = -y \tag{2.0.7}$$

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

$$\mathbf{y} = \frac{1}{2} \tag{2.0.8}$$

Then the value of $\lambda isgivenas$

$$\lambda = \mathbf{x} \implies \lambda = \frac{-1}{2} \tag{2.0.9}$$

Similarly using (1.0.1) and (1.0.3)

$$f\left(x\right) = \lambda g\left(x\right) \tag{2.0.10}$$
$$f\left(x\right) = 1, g\left(x\right) = -1 \tag{2.0.11}$$
$$f\left(y\right) = 1, g\left(y\right) = 1 \tag{2.0.12}$$

Substituting the values in (2.0.10), we get

$$\mathbf{x} = -\lambda \tag{2.0.13}$$
$$\mathbf{y} = \lambda \tag{2.0.14}$$

Finally we get Z=0 with

$$\mathbf{x} = \frac{-1}{2} \tag{2.0.15}$$
$$\mathbf{y} = \frac{1}{2} \tag{2.0.16}$$

$$MaxZ = None \tag{2.0.17}$$

There is no optimal maximum solution for this.

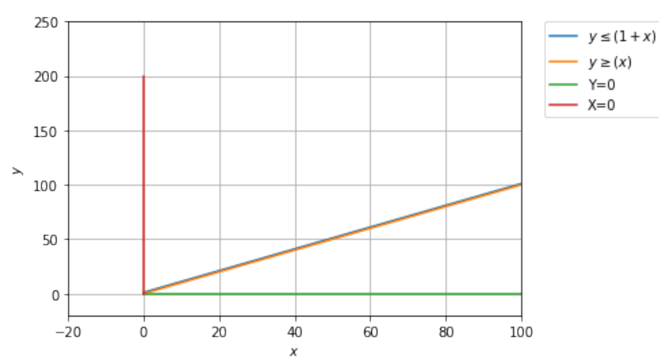


Fig. 0: Graphical solution