Assignment 1

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Download all python codes from

https://github.com/neharani289/ee14014/Assignment1/codes

and latex-tikz codes from

https://github.com/neharani289/ee14014/Assignment1

Q no. 46. what are the points on the y-axis whose distance from the line (4 3)x = 12 is 4 units.

Solution:

Here ,direction vectors of the lines are $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ normal vector n is given by,

$$\mathbf{n} = \begin{pmatrix} 4 \\ 3 \end{pmatrix} \tag{0.0.1}$$

Using the formula for the distance of a point P from a line

$$d = \frac{|\mathbf{n}^T P - c|}{\|\mathbf{n}\|} \tag{0.0.2}$$

Since the point lies on the y-axis. let

$$P = \begin{pmatrix} 0 \\ k \end{pmatrix} \tag{0.0.3}$$

the equation of the line is :

$$\mathbf{n}^T x = c \tag{0.0.4}$$

$$\implies \frac{|\mathbf{n}^T P - c|}{\|\mathbf{n}\|} = 4 \tag{0.0.5}$$

$$\implies 3k - 12 = \pm 20 \tag{0.0.6}$$

$$\implies k = -8 \ or \ 32/3 \tag{0.0.7}$$

therefore points on y-axis at distance of P from line are (0,-8) and (0,32/3).