Assignment 1

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Download all python codes from

https://github.com/aayush−1/EE5609−Matrix−Theory/tree/master/codes

and latex-tikz codes from

https://github.com/aayush−1/EE5609−Matrix−Theory

1 Question No. 34

Find the points on the x-axis, whose distances from the line

$$\begin{pmatrix}4 & 3\end{pmatrix}\mathbf{x} = 12 \tag{1.0.1}$$

are 4 units.

2 Explanation

First we can find the lines at a distance of 4 from the given line and then it's intersection with the x-axis.

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

The equation of the parallel lines in terms of the given line is then obtained as

$$\begin{pmatrix}4 & 3\end{pmatrix}\mathbf{x} = 12 + \pm\left\|\begin{pmatrix}3 & 4\end{pmatrix}\right\| * 4 \tag{2.0.1}$$

$$\begin{pmatrix}4 & 3\end{pmatrix}\mathbf{x} = 12 + \pm\sqrt{4^2+3^2} * 4 \tag{2.0.2}$$

The two parallel lines at a distance of 4 thus obtained are:

$$\begin{pmatrix}4 & 3\end{pmatrix}\mathbf{x} = 32$$

$$\begin{pmatrix}4 & 3\end{pmatrix}\mathbf{x} = -8$$

Finally the points on x-axis are:

$$\mathbf{x} = 8$$

and

$$\mathbf{x} = -2$$