Assignment 1

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Download the python code from

https://github.com/jvinaykumar12/EE5609/tree/master/Assignment1

and latex-file codes from

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1 Question No.33

Find the distance of the point $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ from the line

$$\begin{pmatrix} 12 & -5 \end{pmatrix} \mathbf{x} = -82 \tag{1.0.1}$$

2 Explanation

The formula for calculating the distance between the point and the given line is

$$d = \frac{\left| c - \mathbf{n}^{\mathbf{T}} \mathbf{A} \right|}{\|\mathbf{n}\|} \tag{2.0.1}$$

By substituting the given values

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \quad \mathbf{n} = \begin{pmatrix} 12 \\ -5 \end{pmatrix} \quad c = -82 \tag{2.0.2}$$

we get

$$\left| c - \mathbf{n}^{\mathbf{T}} \mathbf{A} \right| = 99 \tag{2.0.3}$$

Thus, the distance between the point and the line is

$$d = \frac{99}{13} \tag{2.0.4}$$

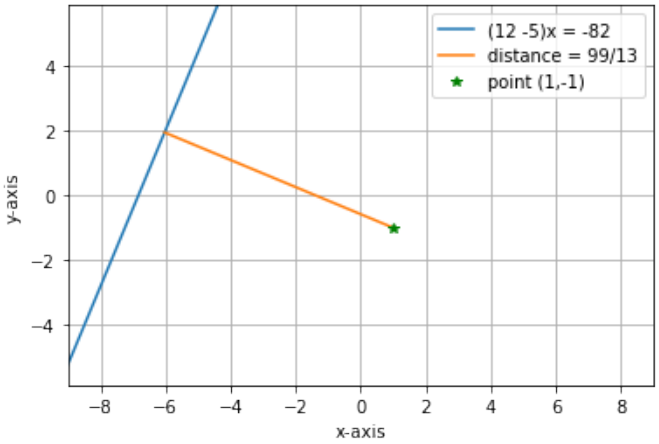

Fig. 0: Plot showing the distance between the point and the line