

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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Thus, the distance between the point and the line is

$$\|P - A\| = \frac{99}{13} \quad (2.0.8)$$

1 QUESTION No.33

Find the distance of the point $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ from the line $(12 \ -5)\mathbf{x} = -82$

2 EXPLANATION

The equation of the given line can be represented in the form

$$(12 \ -5)\mathbf{P} = -82 \quad (2.0.1)$$

$$\mathbf{n}^T \mathbf{P} = \mathbf{c} \quad (2.0.2)$$

The equation of the line perpendicular to the given line and passing through the given point can be written as

$$\mathbf{P} = \mathbf{A} + \lambda \mathbf{n} \quad (2.0.3)$$

The distance from the point to the line is the distance between point of intersection of the above two lines and the given point. The formula for calculating that distance is

$$\|P - A\| = \frac{|\mathbf{c} - \mathbf{n}^T \mathbf{A}|}{\|\mathbf{n}\|} \quad (2.0.4)$$

By substituting the given values

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \quad \mathbf{n} = \begin{pmatrix} 12 \\ -5 \end{pmatrix} \quad c = -82 \quad (2.0.5)$$

we get

$$\mathbf{n}^T \mathbf{A} = 17 \quad (2.0.6)$$

$$\|\mathbf{n}\| = 13 \quad (2.0.7)$$

