SM5083
Assignment Number 01

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1. Chapter II Ex-2 Q.2 II

1.1. Find the distance between the following pair of points (-13,-3) and (-4,15) with axes inclined at 60 degrees.

Solution:

let

$$\mathbf{A} = \begin{pmatrix} -13 \\ -3 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} -4 \\ 15 \end{pmatrix} \tag{1.1.1}$$

And the transform vector(which can be formed by locating where i and j lands after transformation) is given by,

$$\mathbf{X} = \begin{pmatrix} 1 & cos60 \\ 1 & sin60 \end{pmatrix} \tag{1.1.2}$$

let normalisation of vector A and vector B after transformation =

$||\mathbf{X}.\mathbf{B} - \mathbf{X}.\mathbf{A}||^2 = (\mathbf{X}.\mathbf{B} - \mathbf{X}.\mathbf{A})^\top(\mathbf{X}.\mathbf{B} - \mathbf{X}.\mathbf{A}) = \begin{pmatrix} 18.0 & 15.588 \end{pmatrix}\begin{pmatrix} 18.0 \\ 15.588 \end{pmatrix}$

$||\mathbf{X}.\mathbf{B} - \mathbf{X}.\mathbf{A}|| = \sqrt{((18.0)^2 + (15.588)^2)}$

$||\mathbf{X}.\mathbf{B} - \mathbf{X}.\mathbf{A}|| = 28.11$

Distance between A and B when the axes are inclined at 60 degrees is 28.11