

# Assignment 1

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**Abstract**—This document explains the concept of finding the angle between the two vectors

Download all python codes from

<https://github.com/neharani289/ee14014/blob/master/Assignment%20Matrix%20Theory%20.ipynb>

and latex-tikz codes from

<https://github.com/neharani289/ee14014>

Angle between the vectors is given by,

$$\theta = \cos^{-1} \left( \frac{\mathbf{n1}^T \mathbf{n2}}{\|\mathbf{n1}\| \|\mathbf{n2}\|} \right) \quad (3.0.1)$$

$$\|\mathbf{n1}\| = \sqrt{(-1)^2 + \text{sqrt}(3)^2} = \sqrt{4} \quad (3.0.2)$$

$$\|\mathbf{n2}\| = \sqrt{-\text{sqrt}(3)^2 + (-1)^2} = \sqrt{4} \quad (3.0.3)$$

$$\& = \frac{2 \times \sqrt{3}}{2 \times 2} \quad (3.0.4)$$

$$= \frac{\times \sqrt{3}}{2} \quad (3.0.5)$$

$$\Rightarrow \theta = 30^\circ \quad (3.0.6)$$

## 1 PROBLEM

Find the angle between the lines

$$(1 - \sqrt{3})x = 5 \quad (1.0.1)$$

$$(\sqrt{3} - 1)x = -6 \quad (1.0.2)$$

## 2 ANGLE BETWEEN THE TWO VECTORS :

Consider the two vectors ,  $\mathbf{n1}$  and  $\mathbf{n2}$  ,

Dot product between two vectors  $\mathbf{n1}$  and  $\mathbf{n2}$  is given by ,

$$\mathbf{n1}^T \mathbf{n2} = \|\mathbf{n1}\| \|\mathbf{n2}\| \cos \theta \quad (2.0.1)$$

Where angle between the vectors  $\mathbf{a}$  and  $\mathbf{b}$  is denoted by  $\theta$

## 3 SOLUTION

Let ,

**Result :**

Angle between the vectors  $\mathbf{n1}$  and  $\mathbf{n2}$  is :  $\theta = 30$