Assignment 1

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Download all python codes from

https://github.com/neharani289/ee14014/blob/master/Assignment%201%20Matrix%20Theory%20.ipynb

and latex-tikz codes from

https://github.com/neharani289/ee14014

1 Problem

Find the angle between the lines

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

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

2 Angle between the two vectors :

Consider the two vectors , n1 and n2 ,

Dot product between two vectors n1 and n2 is given by ,

$$\mathbf{n1}^T\mathbf{n2} = \|\mathbf{n1}\|\,\|\mathbf{n2}\|\cos\theta \tag{2.0.1}$$

Where angle between the vectors a and b is denoted by θ

3 Solution

Let,

$$\mathbf{n1} = \begin{pmatrix} -1 \\ \sqrt{3} \end{pmatrix} \tag{3.0.1}$$

$$\mathbf{n2} = \begin{pmatrix} -\sqrt{3} \\ 1 \end{pmatrix} \tag{3.0.2}$$

Angle between the vectors is given by,

$$\cos\theta = \frac{\mathbf{n_1}^T\mathbf{n_2}}{\|\mathbf{n_1}\|\,\|\mathbf{n_2}\|} \tag{3.0.3}$$

$$= \frac{2\sqrt{3}}{2\times 2} = \frac{\sqrt{3}}{2} \tag{3.0.4}$$

$$\implies \theta = 30^\circ \tag{3.0.5}$$

Result : Angle between the vectors n_1 and n_2 is : θ =30