

# Assignment 1

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AI20MTECH11005

Substituting (2),(3),(4) in (1) we get

$$\mathbf{d} = \begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix} \quad (5)$$

$$\|\mathbf{d}\| = \sqrt{3^2 + (-3)^2 + 2^2} = \sqrt{22} \quad (6)$$

$$\mathbf{e} = \frac{\mathbf{d}}{\|\mathbf{d}\|} \quad (7)$$

**Abstract**—This document finds a unit vector parallel to a given vector

Download all python codes from

<https://github.com/Matish007/Matrix-Theory-EE5609-/tree/master/codes>

and latex-tikz codes from

<https://github.com/Matish007/Matrix-Theory-EE5609->

$\mathbf{e}$  is the unit vector parallel to given vector

Substituting (5),(6) in (7) we get

$$\mathbf{e} = \frac{1}{\sqrt{22}} \begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix} \quad (8)$$

Equation 8 gives us a unit vector  $\mathbf{e}$  parallel to  $2\mathbf{a} - \mathbf{b} + 3\mathbf{c}$

## 1 PROBLEM

Find a unit vector parallel to  $2\mathbf{a} - \mathbf{b} + 3\mathbf{c}$

$$\mathbf{a} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}, \mathbf{c} = \begin{pmatrix} 1 \\ -2 \\ 1 \end{pmatrix}$$

## 2 EXPLANATION

First calculate  $2\mathbf{a} - \mathbf{b} + 3\mathbf{c}$ . Then divide the resultant vector with its magnitude, that will be a unit vector parallel to  $2\mathbf{a} - \mathbf{b} + 3\mathbf{c}$

$$\mathbf{d} = 2\mathbf{a} - \mathbf{b} + 3\mathbf{c} \quad (1)$$

$$2\mathbf{a} = \begin{pmatrix} 2 \\ 2 \\ 2 \end{pmatrix} \quad (2)$$

$$-\mathbf{b} = \begin{pmatrix} -2 \\ 1 \\ -3 \end{pmatrix} \quad (3)$$

$$3\mathbf{c} = \begin{pmatrix} 3 \\ -6 \\ 3 \end{pmatrix} \quad (4)$$