

# Assignment 1

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Download the latex-tikz codes from:

[https://github.com/tanayyadav28/EE3900-Assignments/blob/main/Assignment%201/Assignment\\_1.tex](https://github.com/tanayyadav28/EE3900-Assignments/blob/main/Assignment%201/Assignment_1.tex)

## 1 PROBLEM

[Vectors Q2; Q23]

Find a unit vector in the direction of  $\mathbf{A} + \mathbf{B}$  where,

$$\mathbf{A} = \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix} \quad (1.0.1)$$

## 2 SOLUTION

Let  $\mathbf{C}$  be the vector  $\mathbf{A} + \mathbf{B}$

$$\mathbf{C} = \mathbf{A} + \mathbf{B} \quad (2.0.1)$$

$$\therefore \mathbf{C} = \begin{pmatrix} 4 \\ 3 \\ -2 \end{pmatrix} \quad (2.0.2)$$

Now,

$$\|\mathbf{C}\| = \sqrt{(4)^2 + (3)^2 + (-2)^2} \quad (2.0.3)$$

$$\therefore \|\mathbf{C}\| = \sqrt{29} \quad (2.0.4)$$

Let  $\mathbf{H}$  be the unit vector in the direction of  $\mathbf{C}$ .

$$\mathbf{H} = \frac{\mathbf{C}}{\|\mathbf{C}\|} \quad (2.0.5)$$

$$\therefore \mathbf{H} = \frac{1}{\sqrt{29}} \begin{pmatrix} 4 \\ 3 \\ -2 \end{pmatrix} \quad (2.0.6)$$

Hence,  $\mathbf{H}$  is the required unit vector.