Assignment 1

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Download the python codes from:

https://github.com/tanayyadav28/EE3900–Assignments/blob/main/Assignment_1/code/Assignment_1.py

Download the latex-tikz codes from:

https://github.com/tanayyadav28/EE3900–Assignments/blob/main/Assignment_1/Assignment_1.tex

1 Problem

[Vectors Q2; Q23]
Find a unit vector in the direction of $\mathbf{A}+\mathbf{B}$ where,

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

2 Solution

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

$$\mathbf{C}=\mathbf{A}+\mathbf{B} \tag{2.0.1}$$

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

Now,

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

$$\therefore \|\mathbf{C}\|=\sqrt{29} \tag{2.0.4}$$

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

$$\mathbf{H}=\frac{\mathbf{C}}{\|\mathbf{C}\|} \tag{2.0.5}$$

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

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

figures/fig_1.png

Fig. 0: Plot of the Vectors