

Assignment - 2

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Abstract—This is a simple document to learn about writing vectors and matrices using latex, draw figures using Python, Latex.

Download all and latex-tikz codes from

svn co <https://github.com/Ganeshyadav712/Assignment-2.git>

Question taken from

https://github.com/gadepall/ncert/blob/main/linalg/vectors/gvv_ncert_vectors.pdf– Q.no.2.23

The unit vector is calculated as

$$\frac{\mathbf{c}}{\|\mathbf{c}\|} = \frac{\begin{pmatrix} 4 \\ 5 \\ -2 \end{pmatrix}}{\left\| \begin{pmatrix} 4 \\ 5 \\ -2 \end{pmatrix} \right\|} \quad (5)$$

$$= \frac{1}{\sqrt{45}} \begin{pmatrix} 4 \\ 5 \\ -2 \end{pmatrix} \quad (6)$$

1 QUESTION

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

$$\mathbf{a} = \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix}$$

2 SOLUTION

$$\text{Given, } \mathbf{a} = \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix}$$

$$\mathbf{c} = (\mathbf{a} + \mathbf{b}) \quad (1)$$

$$= \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix}$$

$$= \begin{pmatrix} 4 \\ 5 \\ -2 \end{pmatrix} \quad (2)$$

Magnitude of vector \mathbf{c}

$$\|\mathbf{c}\| = \sqrt{(4)^2 + (5)^2 + (-2)^2} \quad (3)$$

$$= \sqrt{16 + 25 + 4} = \sqrt{45} \quad (4)$$