

Assignment 1

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Download latex-tikz codes from

<https://github.com/YashasTadikamalla/EE3900/blob/main/Assignment1/Assignment1.tex>

1 PROBLEM (VECTORS Q2.24)

Find a unit vector in the direction of

$$\begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix}.$$

2 SOLUTION

Given, a vector

$$\mathbf{a} = \begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix} \quad (2.0.1)$$

$$\|\mathbf{a}\| = \sqrt{(1)^2 + (1)^2 + (-2)^2} = \sqrt{6} \quad (2.0.2)$$

To find: A unit vector along \mathbf{a} . Let it be $\hat{\mathbf{u}}$

We know, a unit vector $\hat{\mathbf{n}}$ along \mathbf{v} is given by

$$\hat{\mathbf{n}} = \frac{\mathbf{v}}{\|\mathbf{v}\|} \quad (2.0.3)$$

Using (2.0.3),

$$\hat{\mathbf{u}} = \frac{\mathbf{a}}{\|\mathbf{a}\|} \quad (2.0.4)$$

$$\therefore \hat{\mathbf{u}} = \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix} \quad (2.0.5)$$