Assignment 1

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1 Vectors Q2.21

Find the unit vector in the direction of

$$\begin{bmatrix} 2 \\ -1 \\ -2 \end{bmatrix} \quad (1.0.1)$$

2 Solution

Let U be the unit vector in the direction of given vector,

$$V = \begin{bmatrix} 2 \\ -1 \\ -2 \end{bmatrix} \quad (2.0.1)$$

We get,

$$\|V\| = \sqrt{(2)^2 + (-1)^2 + (-2)^2} \quad (2.0.2)$$
$$\therefore \|V\| = 3 \quad (2.0.3)$$

By definition,

$$U = \frac{V}{\|V\|} \quad (2.0.4)$$

$$\therefore U = \frac{1}{3}\begin{bmatrix} 2 \\ -1 \\ -2 \end{bmatrix} \quad (2.0.5)$$