

2. [6 pts] Is the vector $\vec{b} = \begin{pmatrix} -4 \\ -3 \\ 2 \end{pmatrix}$ a linear combination of the vectors $\vec{v} = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$ and $\vec{w} = \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix}$

? If so, write down the linear combination in the format $\vec{b} = c_1 \vec{v} + c_2 \vec{w}$. If not, explain why not.

$$\begin{pmatrix} -4 \\ -3 \\ 2 \end{pmatrix} = c_1 \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} + c_2 \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix}$$

For \vec{b} to be a linear combination of \vec{v} and \vec{w} , $c_1 = 5$, $c_2 = -3$

$$5 - 3(3) = -4$$

$$0 - 3(1) = -3$$

$$5 - 3(1) = 2 \quad \checkmark$$

$\therefore \vec{b}$ is a linear combination of \vec{v} and \vec{w} where

$$\vec{b} = 5\vec{v} - 3\vec{w} //$$