

Quiz 3

1. Write the vector $\mathbf{u} = \begin{bmatrix} 0 \\ 3 \\ -2 \end{bmatrix}$ as a linear combination of the vectors $\mathbf{v} = \begin{bmatrix} 4 \\ 1 \\ 0 \end{bmatrix}$, $\mathbf{w} = \begin{bmatrix} 2 \\ -4 \\ 3 \end{bmatrix}$.
(10 pts.)

2. Is the set $\{\mathbf{u}, \mathbf{v}, \mathbf{w}\}$ linearly independent or linearly dependent (with $\mathbf{u}, \mathbf{v}, \mathbf{w}$ as above)? Clearly explain your answer for full credit.
(4 pts.)

3. Define the linear transformation T as follows.

$$T \left(\begin{bmatrix} x \\ y \\ z \end{bmatrix} \right) = \begin{bmatrix} x - 2y + z \\ x + y - z \end{bmatrix}$$

- Compute $T(\mathbf{u}), T(\mathbf{v}), T(\mathbf{u} + \mathbf{v})$, and state the domain and codomain of T (with \mathbf{u}, \mathbf{v} as above).
(6 pts.)