

QUIZ 5

Time: 10min

1. If \mathbf{u} and \mathbf{v} are in \mathbf{R}^n , how are $\mathbf{u}^T \mathbf{v}$ and $\mathbf{v}^T \mathbf{u}$ related? How are $\mathbf{u} \mathbf{v}^T$ and $\mathbf{v} \mathbf{u}^T$ related?
2. Does the matrix $\begin{bmatrix} 7 & 9 \\ -6 & -8 \end{bmatrix}$ have an inverse? Why or why not? If there exists an inverse, what is it?

Each part is worth 5 points.

Bonus (5 points) Let $T: \mathbf{R}^n \rightarrow \mathbf{R}^m$ be a linear transformation. Prove that T is one-to-one if and only if the equation $T(\mathbf{x}) = \mathbf{0}$ has only the trivial solution.