

Quiz 10 (11am)

For the problems below let

$$v_1 = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}, \quad v_2 = \begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix}, \quad w = \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}.$$

1. Are v_1 and v_2 orthogonal? Show your work. (2 pts.)
2. Find $v_2 \cdot (v_1 - v_2)$. (6 pts.)
3. Find $\text{proj}_w(v_1)$ the projection of v_1 onto w . (6 pts.)
4. Express v_1 as $v_1 = u_1 + u_2$ where u_1 is in the direction of w and u_2 is orthogonal to w , that is they satisfy $u_1 \in \text{span}(w)$ and $u_2 \in \text{span}(w)^\perp$. (6 pts.)