

Assignment 6

[1pt] 1. Find a basis for the orthogonal complement of $\text{Span} \left\{ \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix} \right\}$.

[3pt] 2. Use the Gram-Schmidt Procedure to produce an orthogonal basis for the subspace spanned by

$$\left\{ \begin{bmatrix} 1 \\ 2 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 1 \\ 3 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 5 \\ 3 \\ 4 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \\ -1 \\ 2 \end{bmatrix} \right\}$$

[3pt] 3. Find a and b to obtain the best-fitting equation of the form $y = a + bt$ for the data $\{(0, -5), (2, -1), (4, 2)\}$.

[3pt] 4. Determine the vector \vec{x} that minimizes $\|\vec{b} - A\vec{x}\|$ for the system

$$\begin{array}{rcl} 3x_1 - x_2 & = & 3 \\ x_1 + x_2 & = & 2 \\ 2x_1 - 2x_2 & = & 4 \end{array}$$