

MATH 6701 - HW 1

Justify all your answers

Name:

Problem 1 (5 points): Solve the system

$$-x_2 + x_3 = 1$$

$$x_1 + 2x_2 + x_4 = 2$$

$$x_1 - x_2 + 3x_3 + x_4 = 5$$

Problem 2 (5 points): Find an orthonormal basis of the subspace $S = \{x \in \mathbb{R}^4 : x_1 + x_2 + x_4 = 0 \text{ and } x_1 + 2x_2 + x_3 = 0\}$.

Problem 3 (5 points): Let

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}.$$

Compute A^{-1} .

Problem 4 (5 points): Find the eigenvalues and eigenvectors of

$$A = \begin{bmatrix} 2 & -1 \\ 5 & 0 \end{bmatrix}.$$

Problem 5 (5 points): Diagonalize

$$A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 0 & 2 \\ 0 & 2 & 0 \end{bmatrix}.$$

Problem 6 (5 points): Find the line that best fit the data $\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \end{bmatrix},$