EE2302 Foundations of Information Engineering

Assignment 8 **Due: 6 pm, Nov 10**

Full Mark: 12 points

1. (4 marks) The set of all 2×2 real matrices in the form of $A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$ is a vector space. Consider the subset of 2×2 real matrices which satisfy $a_{12} = -a_{21}$. Does it form a subspace? Prove or disprove it.

2. (3 points) Find the least-square straight line fit to the points $(-1, 4), (0, 5)$, and $(1, 9)$.

3. (5 points) Consider $Ax = b$, where $A = \begin{bmatrix} 2 & -4 \\ -3 & 6 \end{bmatrix}$ and $b = \begin{bmatrix} 8 \\ -12 \end{bmatrix}$. Explain your answer in each of the following question.

    a) Are the column vectors of A linearly independent? Explain your answer.
    b) What is $\mathcal{C}(A)$?
    c) What is rank(A)?
    d) What is $\mathcal{N}(A)$?
    e) Find the general solution for x.