HOMEWORK SET #8

EE 510: Linear Algebra for Engineering

Assigned: 20 October 2024
Due: 27 October 2024

Directions: Please show all work and box answers when appropriate.

1. Introduction to Linear Algebra by Gilbert Strang (5th Edition):

   a) Problem Set 6.3: #1, #4, #10

2. Introduction to Linear Algebra by Gilbert Strang (5th Edition):

   a) Problem Set 6.4: #4, #5, #7, #13.

3. Introduction to Linear Algebra by Gilbert Strang (5th Edition):

   a) Problem Set 9.2: #8, #9, #11, #16.

4. Let A be a unitary matrix such that $A \in \mathbb{C}^{n\times n}$.

   a) Show that the absolute value of the determinant $|Det(A)| = 1$.

   b) Show that if the eigenvalues of A are distinct then their eigenvectors are orthogonal.

5. Find the values of a, b, and c, all nonzero, such that the matrix A below is diagonalizable over $\mathbb{R}$:

$$A = \begin{bmatrix} 2 & a & b \\ 0 & -5 & c \\ 0 & 0 & 2 \end{bmatrix}.$$

6. If $A \in \mathbb{C}^{m\times n}$, prove or disprove that the eigenvalues of $A^H A$ are nonnegative.