

HOMEWORK SET #6

EE 510: Linear Algebra for Engineering

Assigned: 30 September 2023

Due: 7 October 2023

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

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

a) Problem Set 6.1: #19, #24, #27, #29.

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

a) Problem Set 6.2: #9, #19, #27.

3. Let A be a 4×4 matrix where

$$A = \begin{bmatrix} 2 & 4 & 2 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 \end{bmatrix}.$$

Find a real matrix B such that $A = B^3$.

4. Show that if λ is an eigenvalue of A with the corresponding eigenvector x , then for any scalar c , x is an eigenvector of $A - cI$ corresponding to the eigenvalue $\lambda - c$.

5. Show that if T is invertible then the trace of $T^{-1}AT$ equals the trace of A .