# HOMEWORK SET #7

EE 510: Linear Algebra for Engineering

Assigned: 12 October 2024
Due: 19 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 6.1: #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 $4\times$ 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 $\lambda$ 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 $A$.