

1. Prove from the definition of similarity that

$$\begin{bmatrix} 2 & 1 \\ -0 & 2 \end{bmatrix} \quad \text{and} \quad \begin{bmatrix} 2 & 0 \\ -0 & 2 \end{bmatrix}$$

are not similar.

2. Find out how to obtain eigenvalues and eigenvectors of a matrix in MATLAB (Try `>>help eig`). Using MATLAB as much as possible, find a fundamental matrix for $\mathbf{y}' = A\mathbf{y}$ where

$$A = \begin{bmatrix} 4 & -5 & 0 & 3 \\ 0 & 4 & -3 & -5 \\ 5 & -3 & 4 & 0 \\ 3 & 0 & 5 & 4 \end{bmatrix}$$

(Remark: MATLAB provides *normalized* eigenvectors. You may find it easier to multiply by a convenient factor to get a non-normalized form.)

3. Work problem 9, page 105 of the text in its entirety.