

Supplementary problems: 8.8 # 1, 3, 5, 7, 10, 11, 13, 14, 21; 10.1 # 1, 3, 7, 11, 13, 17

Quiz: 8.8 and 10.1

Compulsory problems:

(1) Consider the following matrix,

$$A = \begin{bmatrix} 1 & -1 \\ 1 & \alpha \end{bmatrix}$$

- (a) [6 pts.] Find the eigenvalues of A in terms of α .
- (b) For what values/intervals of α are the eigenvalues
 - (i) [2 pts.] Real distinct
 - (ii) [2 pts.] Real repeated
 - (iii) [2 pts.] Complex conjugate
- (c) [4 pts.] What are the eigenvectors of A if $\alpha = -3$?

(2) [4 pts.] Do the following vector valued functions constitute a fundamental set of solutions on $(-\infty, \infty)$? (Show all work)

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{\sin^2 x}, \quad \begin{pmatrix} 1 \\ 2 \end{pmatrix} e^{\cos^2 x}$$

Your homework raw score is: $\frac{n}{2m} \cdot M + \left(1 - \frac{n}{2m}\right) \cdot N = N + \frac{n}{2m}(M - N)$. For this homework, $M = 20$, $m = 15$, N is the number of compulsory problems you get correct, and n is the number of supplementary problems you complete. It should be noted that for the supplementary problems I will be looking for **full completion**, but I won't take off points for mistakes.