King Fahd University of Petroleum and Minerals
Quiz 4 Math 260 Semester: 143 Duration: 50 minutes

Full Name: ID:
Section and Serial number:

Question 1 Let

$$A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}.$$

Check if A is diagonalizable or not. If so, find an invertible matrix P and a diagonal matrix D such that $D = P^{-1}AP$.

Question 2 Verify that

$$X = C_1 \mathrm{e}^{-t} \begin{pmatrix} 6 \\ -1 \\ -5 \end{pmatrix} + C_2 \mathrm{e}^{-2t} \begin{pmatrix} -3 \\ 1 \\ 1 \end{pmatrix} + C_3 \mathrm{e}^{3t} \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix} + \begin{pmatrix} t \\ 0 \\ 0 \end{pmatrix}$$

form a general solution of the following system of DEs:

$$\begin{cases} x_1' &= 6x_2 + 1 \\ x_2' &= x_1 + x_3 - t \\ x_3' &= x_1 + x_2 - t \end{cases}$$

Question 3 Solve

$$X' = \begin{pmatrix} 3 & -9 \\ 4 & -3 \end{pmatrix} X$$