

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics and Statistics**

**Math 202**      **Section#:** .....      **Serial #:** ....      **Quiz 5(a) (Term 182)**

**Name :** ..... **ID #**..... **Marks** ...../7

1. Solve the initial-value problem

$$X' = \begin{pmatrix} 2 & -1 \\ 5 & 4 \end{pmatrix} X, \quad X(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

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1. If  $X_c = c_1 \begin{pmatrix} -1 \\ 1 \end{pmatrix} e^{-2t} + c_2 \begin{pmatrix} 3 \\ 1 \end{pmatrix} e^{2t}$  is a solution of the corresponding homogeneous system for the nonhomogeneous system

$$X' = \begin{pmatrix} 1 & 3 \\ 1 & -1 \end{pmatrix} X + \begin{pmatrix} 0 \\ t \end{pmatrix},$$

then find particular solution  $X_p$  for the system.

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1. Find eigenvalues and eigenvectors of the matrix

$$A = \begin{pmatrix} 5 & -1 & 0 \\ 0 & -5 & 9 \\ 5 & -1 & 0 \end{pmatrix}$$