

MATH 267 Section E1 Practice Test Number 4

Problem 1 (35 points)

Calculate a fundamental set of solutions for the following system

$$\vec{x}' = A\vec{x},$$

where A is the matrix

$$A = \begin{pmatrix} 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 2 & 1 \end{pmatrix}.$$

Problem 2 (35 points)

Calculate the solution of the boundary value problem

$$\vec{x}' = A\vec{x}, \quad \vec{x}(0) = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix},$$

where A is the matrix

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

Problem 3 (30 points) Calculate the general solution of the system

$$\vec{x}' = A\vec{x} + \vec{g},$$

$$A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix},$$

$$\vec{g} = \begin{pmatrix} e^t \\ 0 \end{pmatrix}.$$