MATH 267 (Sections A3, C-1) Homework No. 9

Reading

Section 9.4

On line notes on general method to solve linear, homogeneous systems of equations with constant coefficients.

Section 9.5 up to pg. 497 (included)

Section 9.8

Suggested Problems

Section 9.5, Problems 1, 3, 25, 27.

Section 9.8, 1,3,5,7.

Problems to be handed in class (due Monday April 18-th)

Problem 1 (10 points)

Calculate the solution of

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

with

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

Problem 2 (10 points)

Calculate the exponential e^{At} where

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

Problem 3 (10 points)

Calculate the solution of

$$\vec{x}' = A\vec{x} + \vec{f}(t), \qquad \vec{x}(0) = \begin{pmatrix} 1 \\ -1 \end{pmatrix},$$

with

$$A = \begin{pmatrix} 4 & 1 \\ 0 & 4 \end{pmatrix},$$

and

$$\vec{f}(t) = \begin{pmatrix} e^{-t} \\ 1 \end{pmatrix}.$$