

Math 33b, Winter 2013, Tonći Antunović - Homework 8

From the textbook solve the problems:

Section 9.2: 2, 8, 18, 24, 34, 40, 42, 44, 46, 48, 50, 52, 54, 56 and 58.

And also the problems below:

Problem 1. Find the solution of the initial value problem $y' = Ay$, $y(0) = y_0$ where

$$A = \begin{pmatrix} -3 & -2 \\ 2 & 2 \end{pmatrix}, \quad y_0 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

Problem 2. Find the solution of the initial value problem $y' = Ay$, $y(0) = y_0$ where

$$A = \begin{pmatrix} -1 & -1 \\ 1 & -3 \end{pmatrix}, \quad y_0 = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

Problem 3. Find the solution of the initial value problem $y' = Ay$, $y(0) = y_0$ where

$$A = \begin{pmatrix} 3 & 1 \\ -17 & -5 \end{pmatrix}, \quad y_0 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

Problem 4. Find all pair of real valued functions (x_1, x_2) which satisfy

$$x_1' = 5x_1 - 2x_2, \quad x_2' = 2x_1.$$

Problem 5. Write down the matrix A such that the differential equation $y' = Ay$ has the general solution

$$y = e^t \begin{pmatrix} 1 \\ 1 \end{pmatrix} + e^{-2t} \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$