

## Math 325, Spring, 2000

It is time to organize groups for the group projects. By Wednesday, March 1, please form a group with 2 or 3 other students in the class (so a group has 3 or 4 members). Each group should give me a list of the members of the group by March 1.

### Assignment 5, due March 3

**Note:** The grader will not be able to grade this assignment in time for me to return it before the midterm. If you want to have it to study from, you can turn it in the day of the midterm (Wednesday, March 8).

Read Boyce and DiPrima, Sections 7.7-7.9, 9.1, 9.2, and *Differential Equations with Maple*, Chapter 12.

In Boyce and DiPrima, do (by hand, unless otherwise indicated):

In p. 397 #13 find a matrix  $B$  and a matrix  $J$  in Jordan canonical form with  $B^{-1}AB = J$  where  $A$  is the coefficient matrix in the problem. Then solve the problem. Also use Maple to find the matrices  $B$  and  $J$ . The Maple command **jordan**(A,'P') will find the Jordan canonical form  $J$  of  $A$ . The command **eval**(P) will then give the matrix  $B$ . The command **jordan** is in the **linalg** package. (Use the command: **with(linalg)** to load it.) Do p. 404 #1,14, p. 410 #1.

In *Differential Equations with Maple* do Problem Set F #2,4.

Also solve the following problems.

1. Solve:

$$\mathbf{y}' = \begin{bmatrix} 2 & 1 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 3 & 1 & 0 \\ 0 & 0 & 0 & 3 & 1 \\ 0 & 0 & 0 & 0 & 3 \end{bmatrix} \mathbf{y}, \quad \mathbf{y}(0) = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{bmatrix}.$$

2. Find the general solution of

$$\mathbf{y}' = \begin{bmatrix} 3 & 1 & 0 \\ 0 & 3 & 1 \\ 0 & 0 & 3 \end{bmatrix} \mathbf{y}.$$

For the problems from Problem Set F, you may work in groups, following the same rules as for Assignment 2. If you do work in a group, turn these problems in separately from the rest of the assignment.