

MA 341-04: Applied Differential Equations I  
Homework 6  
Instructor: *Dr. Kartik Sivaramakrishnan*

## INSTRUCTIONS

Please complete this assignment with your assigned group members. This assignment will involve MATLAB, so, please plan on starting early. The assignment is due in my office by 10 am on Monday, November 21, 2005 (Note the unusual submission time).

1. Exercise 9.5, Page 543, Problem 35.
2. Exercise 9.5, Page 544, Problem 41.
3. Exercise 9.6, Page 550, Problem 21. Read the hint carefully before proceeding to work on the problem. You should use MATLAB to solve the system of linear equations and also compute eigenvalues and eigenvectors. Do not do these calculations by hand.
4. Exercise 5.5, Page 284, Problem 1. Read the problem carefully and do the following:
  - (a) Write down a system of first order differential equations  $x' = Ax$  for this problem as we discussed in class. Note that there is no forcing term in this system.
  - (b) Review Kartik's MATLAB session with the spring-mass system (Example 1, Section 5.5, Page 279) on the course webpage.
  - (c) Solve the system of first order differential equations obtained in Step (a) to find expressions for  $x(t)$ ,  $y(t)$ ,  $x'(t)$ , and  $y'(t)$  (see Figure 5.25 on page 284 of the book). You only need to repeat the discussion in Kartik's MATLAB session. Please enclose a plot of these quantities too. Can you notice the two angular frequencies of the system?