

Exam 2
Math 341 - Fall 2002
Prof. John A. Pelesko

This is exam #2 of the Fall 2002 semester. Show all your work and be sure to clearly indicate your final answer. Each problem is worth 25 points. Good luck!

(1) Find the general solutions of

$$y'' - y' + \frac{1}{4}y = 3 + \sin(t).$$

(2) Solve the initial value problem

$$y'' - 2y' + 2y = 0, \quad y(\pi/4) = 2, \quad y'(\pi/4) = -2.$$

(3) (25 Points) Consider the initial value problem

$$y'' + by' = 3, \quad y(0) = 1, \quad y'(0) = 0.$$

Find the behavior of the solution as t tends to infinity for all possible values of b . (Hint: Be sure to consider the case $b = 0$.)

(4) What do solutions of

$$y'' + by' + cy = 0$$

do when

- (a) (5 points) $b = 0, c = \pi^2/4$?
- (b) (5 points) $b = 1, c = \pi^2/4$?
- (c) (5 points) $b = 1, c = 0$?
- (d) (5 points) $b = -1, c = 1$?
- (e) (5 points) $b = 2, c = 1$?

Bonus Extra Credit (15 points) (Only completely correct answers are accepted!) WITHOUT SOLVING the equation, compute the Wronskian of two solutions of

$$\cos(t)y'' + \sin(t)y' - ty = 0.$$