

Math 222, Spring 2016.

Present your work in an organized fashion. Make sure that your work is algebraically correct and logically sound. Show all your work. Discussion (if necessary) with others is encouraged, while copying other's solution is a violation of NJIT student honor code.

Homework Problems for Week 7. MATH 222, Spring 2016.

- Problem 1. Consider the initial value problem

$$4y'' + 12y' + 9y = 37 \sin(t), \quad y(0) = 1, \quad y'(0) = 0.$$

(a) Solve the initial value problem and plot its solution for $0 \leq t \leq 5$.

(b) Determine where the solution has the value zero for $0 \leq t \leq 5$.

(c) Determine the coordinates of the local minimum point(s) and local maximum point(s) for $0 \leq t \leq 5$.

- Problem 2. Use the method of reduction of order to find a second solution of the given differential equation. First verify that the given y_1 is a solution (with δ a positive constant coefficient).

$$y'' + \delta(xy' + y) = 0, \quad y_1 = e^{-\delta x^2/2}.$$

- Problem 3. Use the method of undetermined coefficients to determine a suitable form for the particular solution y_p of the ODE below. Do NOT attempt to evaluate the coefficients.

$$y'' + 5y' + 6y = 2t^5 + (3 + 2t)e^{-2t} + 4te^{-3t} \cos(2t).$$

- Problem 4. Solve the initial value problem

$$y'' - 2y' + y = \frac{e^t}{4 + t^2}, \quad y(0) = 0, \quad y'(0) = 0.$$