Math 1270 – Fall 2006

Homework #5

Due October 4

**Problem 1**: Find the solution of the given initial value problem. Sketch the graph of the solution and describe its behavior as $t$ increases.

(a) $y'' + 4y' + 3y = 0$, $y(0) = 2$, $y'(0) = -1$
(b) $6y'' - 5y' + y = 0$, $y(0) = 4$, $y'(0) = 0$
(c) $y'' + 8y' - 9y = 0$, $y(1) = 1$, $y'(1) = 0$

**Problem 2**: Find the solution of the given initial value problem. For which $\alpha$ the solution approaches zero as $t$ increases?

(a) $4y'' - y = 0$, $y(0) = 2$, $y'(0) = \alpha$
(b) $y'' + (3 - \alpha)y' - 2(\alpha - 1)y = 0$

**Problem 3**: Find the solution of the given initial value problem.

$2y'' - 3y' + y = 0$, $y(0) = 2$, $y'(0) = \frac{1}{2}$

Determine the maximum value of the solution and also find the value of $t$ for which the solution is zero.

**Problem 4**: Find the solution of the given initial value problem. Sketch the graph of the solution and describe its behavior as $t$ increases.

(a) $9y'' - 12y' + 4y = 0$, $y(0) = 2$, $y'(0) = -1$
(b) $y'' + y = 0$, $y(\pi / 3) = 2$, $y'(\pi / 3) = -4$
(c) $y'' + 4y' + 5y = 0$, $y(0) = 1$, $y'(0) = 0$
(d) $y'' + 4y' + 4y = 0$, $y(-1) = 2$, $y'(-1) = 1$