

HOMEWORK 11

1. Knowing that y_1 is a solution to the following given homogeneous ODEs, find the general solution to the ODE:

$$(a) \ y_1 = \frac{1}{t}, t^2 y'' + 3ty' + y = 0$$

$$(b) \ y_1 = e^t, (t-1)y'' - ty' + y = 0$$

2. A mass weighing 2 lb stretches a spring 6 in. If the mass is pulled down an additional 3 in and then released, and if there is no damping, determine the position u of the mass at any time t . Find the frequency, period, and amplitude of the motion.

3. With all the data as in Problem 2 and in addition assume there is damping. Find out the condition of the damping coefficient such that the vibration is underdamped, critically damped, and overdamped.

4. With all the data as in Problem 2 and in addition assume the vibration is critically damped, find out the condition on the velocity such that overshoot happens.

5. Maple Lab 3 is assigned and is due the Monday after the next.