

## Lab 7 Expectations

Submit Plots: 1, 3 (2 plots), 4, 6, 7

1. Write system of equations. Submit plot of  $y$  vs.  $t$ . Estimate the period (in seconds) and amplitude (in cm) of the solution. Comment on the speed of the oscillation and give a brief justification for your answer.
2. Show your work to find the general solution of (\*). Be sure to write the final result clearly. Give the period and amplitude.
3. Submit graphs for a stiff spring and a non-stiff spring, indicating which graph corresponds to what stiffness. Answer whether a spring oscillates faster or slower based on your graphs of a stiff spring and a non-stiff spring.
4. Submit a table of the maximum displacement values for  $w = 0.1, 0.2, \dots, 0.9$ , and a graph of maximum displacement vs.  $w$ .
5. Show work to solve equation (\*\*), and write the final solution. Give the equation and slope of the line along which the peaks lie.
6. This problem is similar to #4, except  $\mu = 0.3$ . Submit a table of the maximum displacement values for  $w = 0.1, 0.2, \dots, 0.9$  and  $w$  near the maximum overall displacement, and a graph of the maximum displacements vs.  $w$ . Identify the value of  $w$  that has the greatest maximum displacement.
7. Write a brief response that answers every question stated in the problem. Submit a drawn plot of the graphs from part 4, part 6, and a graph of your guess for what a considerably smaller, non-zero value of  $\mu$  would do to a frequency response curve. Identify where the maximum displacement value would occur on your guess graph, and explain why you think the maximum would occur at that value of ( $w$ , max. displacement).