

Matlab Sheet 1

Solution of the vibration equation

1. Plot the time response of each of the following second-order differential equations by using Matlab
 - a. $\ddot{x} + 9x = 6e^t, x_o = 1, v_o = 1.$
 - b. $\ddot{x} + 16x = 10 + 3e^{-t}, x_o = 0, v_o = 1.$
 - c. $3\ddot{x} + 25x = t^2e^{-t} + t, x_o = 1, v_o = 0.$
 - d. $2\ddot{x} + 3\dot{x} + 2x = 10t(1 + \sin 2t), x_o = 1, v_o = 0.$
 - e. $\ddot{x} - 2\dot{x} + 5x = e^{-3t}(1 - t\sin 3t), x_o = 1, v_o = 2.$
 - f. $2\ddot{x} + 15\dot{x} + 6x = 3e^{-2t} + te^{-3t}, x_o = 1, v_o = 4.$
2. Discuss the stability of the dynamic systems whose differential equation is given in problems 1.

Hint

1. Use Matlab "Sheet_1_general_final" Program to solve Problem 1.
2. Use Matlab "RK_1_mass_Final" Program to solve Problem 2,4.