Sample 6a

In a damped spring-mass oscillator driven by a horizontal time-dependent force, the mass is initially stationary with the spring stretched a distance of .5 m from its equilibrium position. The differential equation for the oscillator is

$$m\frac{d^2x}{dt^2} + c\frac{dx}{dt} + kx = 32\sin(3t)\cos(5t)$$

where the mass m = 3.6 kg, the damping coefficient c = 2.8 N·s/m, the spring constant k = 19 N/m, x is the displacement of the mass from its equilibrium position, and t is the time.

Write a MATLAB program as follows:

1) **t will go from 0 to 20 sec in steps of .001 sec.**

2) **Calculate the displacement x and velocity v of the mass for each value of t. Use 1e-7 as the accuracy factors.**

3) **Plot x in blue and v in red versus t and the t axis in black. The graph should look like the one on the attached sheet.**