Modelling by Second Order Linear Equations (4.4)

1. A mass of 20 g stretches a spring 5 cm. Suppose that the mass is also attached to a viscous damper with a damping constant of 0.4 N-s/m. If the mass is pulled down an additional 2 cm and then released, find its position y at any time t. Plot y versus t.

2. A mass weighing 8 lb stretches a spring 1.5 in. The mass is also attached to a damper with a coefficient γ. Determine the value of γ for which the system is critically damped. Solve the mass-spring system with this value of γ. Sketch the solution in the $ty-$plane.

3. A mass weighing 2 pounds stretches a spring 6 inches. The mass is displaced an additional 4 inches, and set to motion with an initial downward velocity of 2 ft/s. Assuming no damping, determine the amplitude and the period of the motion.