An Oscillator with a Parameter

Math 230

1. Find the solution to the initial value problem:

$$y'' + 10y = \cos(\omega t) \qquad \text{with} \qquad y(0) = 0, y'(0) = 0.$$

Here, ω is a parameter. Make sure you consider all real values of ω.

2. Plot your solution for the following values of ω:

(a) $\omega = 0$

(b) $\omega = 2$

(c) $\omega = 3$

(d) $\omega = \sqrt{10}$

What do you observe? You may wish to plot solutions for other choices of ω, or use the *Mathematica* `Manipulate` function to see the plot change as you adjust ω.