

PHY3110 HW4

Due Thursday Oct 13 at 5pm in Hawley's Office.

1. A simple harmonic oscillator has a frequency  $\omega = 10$  rad/s. At  $t=0$ , it has an initial position of  $x = -0.1$  m and initial velocity  $v_0 = 0.5$  m/s.

- a. For the form  $x(t) = B\sin(\omega t) + C\cos(\omega t)$ , find  $B$  and  $C$ .
- b. For the form  $x(t) = A\cos(\omega t + \phi)$  find  $A$  and  $\phi$ .

2. For a damped, driven oscillation, derive the resonant frequency (3.63) by finding the maximum of the amplitude (3.59) – and then find an expression for the maximum amplitude (using this frequency).

3. Problem 3-4 in the textbook.

4. Problem 3-8 in the textbook.

5. Problem 3-10 in the textbook