Physics 242; homework set 1

- 1. From Lecture notes exercises: 1.1, 1.2 1.6
- 2. (I.G. Main, 1.5) The system shown at rest in Figure 1.a could be set into motion by giving it an initial displacement A_1 and an initial velocity v_1 (both to the right, say). Assuming that the motion is started in this way at time t = 0, show that the amplitude A and the phase constant ϕ are given by

$$A = [A_1^2 + (v_1/\omega_0)^2]^{1/2}$$
(1)

$$\tan(\phi) = -v_1/A_1\omega_0 \tag{2}$$



Figure 1: (a) the prototype vibrator in equilibrium. (b) The mass is instantaneously displaced a distance ψ to the right of its equilibrium position.