

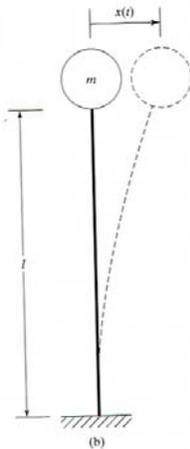
Assignment 1

(Due Jan 30)

1. Consider two harmonic motions of different frequencies: $x_1(t) = 2 \cos(2t)$ and $x_2(t) = \cos(3t)$. Is the sum $x_1(t) + x_2(t)$ a harmonic motion? If so, what is its period?
2. Determine the natural frequency of the mass M on the end of a cantilever beam of negligible mass.
3. Problem 1.3
4. The column of the water tank is 300 ft high and it is made of reinforced concrete with a tubular cross section of inner diameter 8 ft. and outer diameter 10 ft. The tank weighs 600000 lb with water. By neglecting of the mass of the column and assuming the Young's modulus of reinforced concrete as 4×10^6 psi, determine the following: a) the natural frequency and the natural time period of transverse vibration of the water tank; b) the vibration response of the water tank due to a initial transverse displacement of 10in; c) the maximum values of the velocity and acceleration experienced by the water tank.



(a)



(b)