

[2] (25 points) Your experiment requires using a large pump with a heavy motor (total mass m), which is on the floor next to your experiment. Unfortunately, the vibration from the motor significantly degrades your experiment. To reduce these vibrations the motor is placed on a heavy rubber pad which is compressed by an amount Δx by the motor. Model the rubber pad as a simple damped spring with spring constant k .

a) Estimate the frequency f_0 (in Hz.) of the vibrations that are transmitted through the pad with the least attenuation (i.e. the resonance frequency). Assume an acceleration due to gravity of g .

b) If the motor vibrates at 60 Hz, should the resonance frequency found in part a) be higher or lower than 60 Hz? Why?