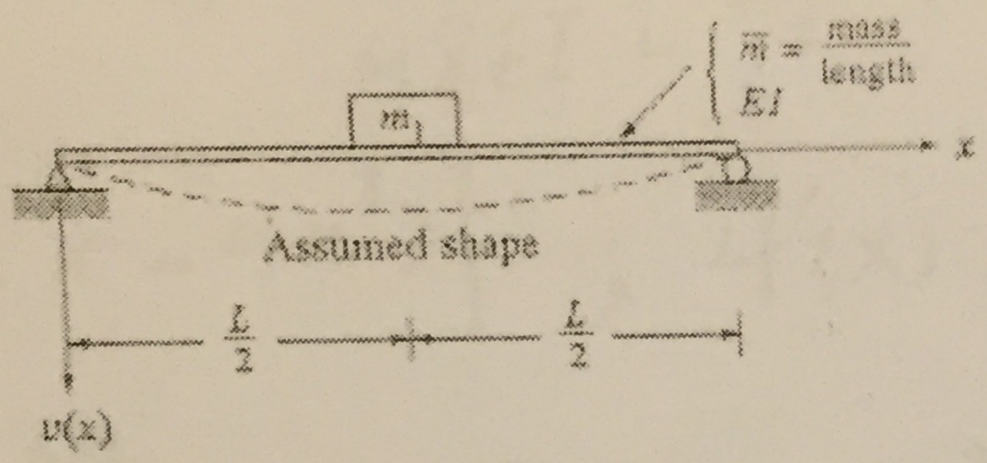
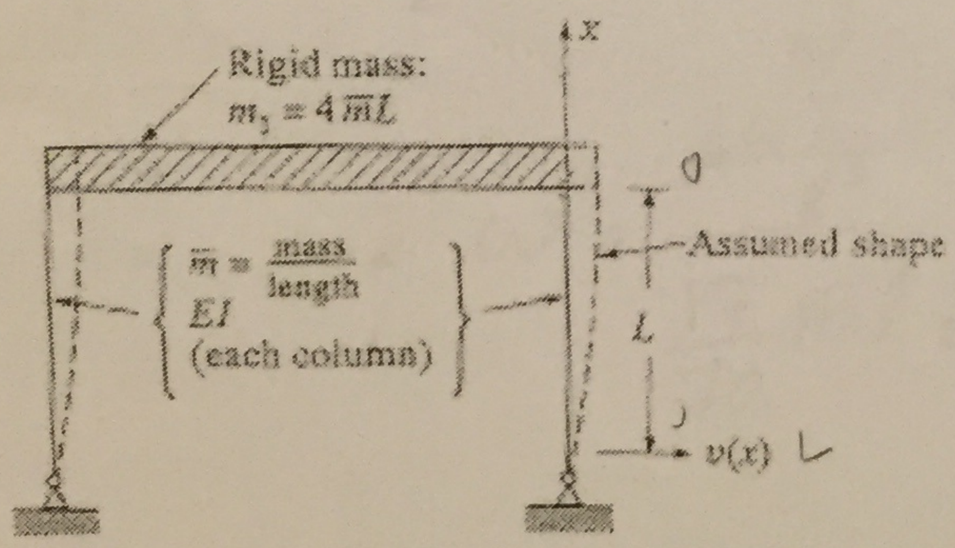
EM 633
H.W. # 6

1. By Rayleigh's method, compute the period of vibration of the uniform beam supporting a central mass m_1 shown in Fig. P8-6. For the assumed shape, use the deflection produced by a central load p; i.e., $v(x) = px(3L^2 - 4x^2)/48EI$ for $x \leq L/2$. Consider the cases: (*a*) $m_1 = 0$, and (*b*) $m_1 = 3\overline{m}L$.



2. (*a*) Determine the period of vibration of the frame shown below in Fig. P8-7, assuming the girder to be rigid and the deflected shape of the columns to be that due to a lateral load p acting on the girder $v(x) = p(2L^3 - 3L^2x + x^3)/12EI$;

(*b*) What fraction of the total column weight assumed lumped with the girder weight will give the same period of vibration as was found in part *a*?



3. The shear building of Fig. P8-8 has its entire mass lumped in the rigid girders. For the given mass and stiffness properties, and assuming a linear initial shape (as shown), evaluate the period of vibration by: Rayleigh's method.