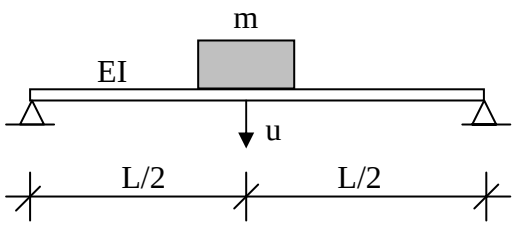
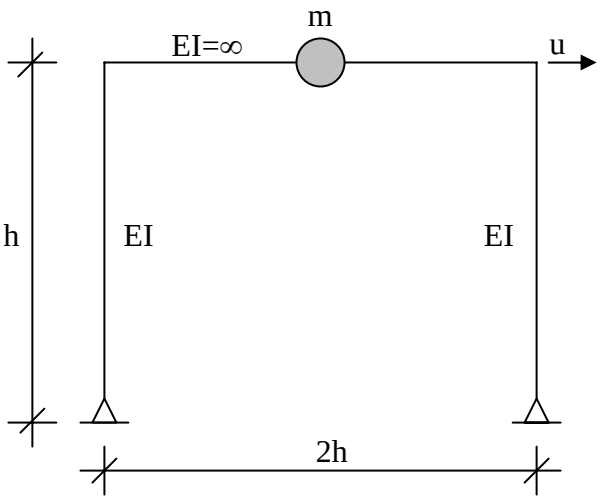
CE 487 **HOMEWORK – 1** **13/10/2006 (Due 1 week)**

---

1. Determine the equation of motion for free vibration of the systems below. Ignore damping and the masses of members.



(a)



(b)

2. Determine the natural periods of the systems above if
L = 6m, h = 3m, E = 25 GPa, I = 3e-3 m^4, m = 100 tons

3. Study Coulomb damping. Then compare Coulomb damping with viscous damping and comment on how the free vibration motion ends in two different damping mechanisms.

4. If the frame in question 1(b) has a damping ratio of 10% and a force P(t) = (1kN).sinωt is applied when it is initially at rest ($\omega=0.25\omega_n$), calculate its displacement response u(t), and plot on the u-t plane.

NOTE: Hand solutions are required for all questions.