ECE/ME 550 Fall 2008
Homework #3
Due October 17, 5:00 pm

From the text Foundation of MEMS, do the following problems:

3.24, 3.26
Note: For problem 3.24, use E = 165 GPa and $\nu = 0.2$.

4.4, 4.11, 4.12

11.5, 11.6,

A. In class, we discussed finding the stiffness of a folded-beam suspension. Use this information to design a folded-beam resonator with a resonant frequency of 100 kHz. Choose an appropriate material for the resonator.

B. A polysilicon beam is 100 μm long, 20 μm wide, and 2.5 μm thick. It is fixed on both ends. Calculate the amount of compressive residual stress that would be required to cause the beam to buckle. Assume Young's modulus of 165 GPa.

C. Find three published papers describing MEMs devices that are actuated using electrostatic forces. Provide their references and calculate/estimate the amount of force generated by the devices.