Problem Set #3
3.11 Fall 2003

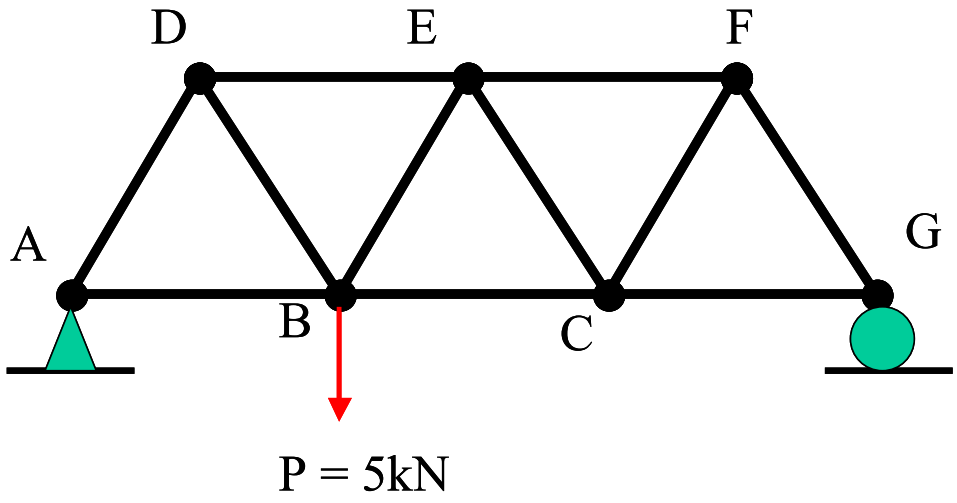
Note: For truss problems, you may verify your answer with MDSolids software, but you should solve the problem manually and show all work.

1. Plot the longitudinal stiffness E// of an E-glass (fiber)/epoxy (matrix) unidirectionally reinforced composite as a function of volume fraction. Necessary values of material properties can be downloaded from here:
http://web.mit.edu/course/3/3.11/www/modules/props.html

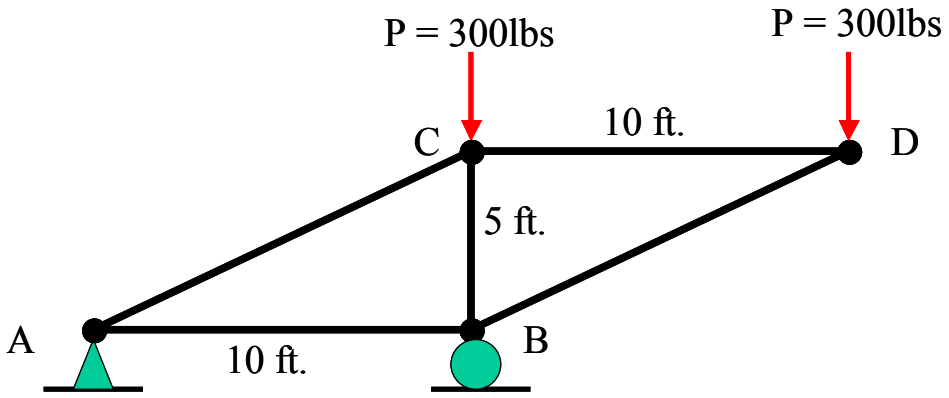
2. A metal Matrix composite is made up of randomly dispersed silicon carbide particles (E = 450GPa) in an aluminum matrix (69GPa). Plot the upper and lower bounds for the Young's Modulus of the composite made using these materials, and from this, estimate the Young's Modulus of the composite with 25% volume fraction of the particles.

3. Do Problem 2.2-8 from Gere. (Simple Truss Problem)

4. Calculate the forces in all members of the following truss (each member length is 1m), indicating whether each member is in tension or compression.



4. Calculate the forces in all members of the following truss, indicating whether each member is in tension or compression.



5. Calculate the magnitude of the forces in member DE of the truss shown below. Indicating whether each member of the diagram is in tension or compression.