ME 323: Mechanics of Materials ***Homework Set H20***

Summer 2024 ***Assigned/Due: July 9/July 11***

Consider the beam shown below that is supported by a roller at C, and by a fixed wall at end H. A end load *P* acts at B. The cross section has a second area moment of *I* and is made up of a material having a Young's modulus of *E*. It is desired to determine the reactions at supports C and H using Castigliano's method. To this end:

a) Draw a free body diagram of the entire beam and write down the equilibrium equations. Show that the problem is statically indeterminate.
b) Choose an appropriate set of redundant constraint force(s) from your FBD above.
c) Write down the strain energy expression for the beam. You may neglect the contributions to the strain energy from shear.
d) Use Castigliano's method to determine the reactions at C and H.