ES120 Spring 2018 – Section 2 Notes

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Problem 1:

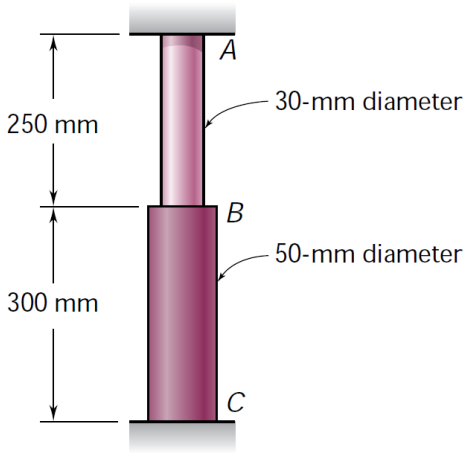

Figure 1

A rod consisting of two cylindrical portions AB and BC is restrained at both ends. Portion AB is made of steel ($E_s = 200$ GPa,$\alpha_s = 11.7 \times 10^6/°C$) and portion BC is made of brass ($E_b = 105$ GPa, $\alpha_b = 20.9 \times 10^6/°C$). Knowing that the rod is initially unstressed, determine the compressive force induced in ABC when there is a temperature rise of 50°C.

Problem 2:

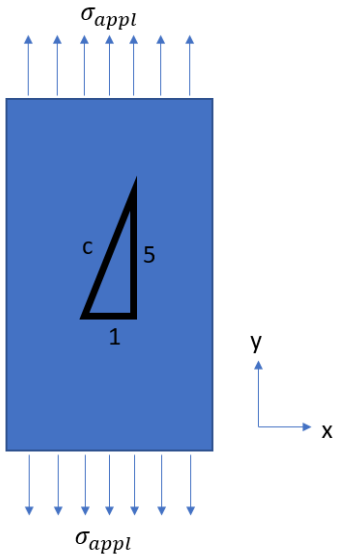

Figure 2

Assuming a triangle is drawn in a block of material which material properties are given by $E = 100$ GPa and $\nu = 100MPa$, determine the length of the hypotenuse of the triangle (c) in the block's deformed state.