PHYS 351 #4

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February 10, 2016

Suppose that we have some idealized elastic substance that can stretch in one dimension. (We dont worry about the volume of the material.) Let it have the equation of state $F = bT[\frac{L}{L_0} - (\frac{L_0}{L})^2]$ here F is the force of tension, b is a positive constant, and the length L_0 at zero tension is a function only of the temperature T. Calculate the amount of work required to compress the substance isothermally and reversibly from $L = L_0$ to $L = \frac{1}{2}L_0$