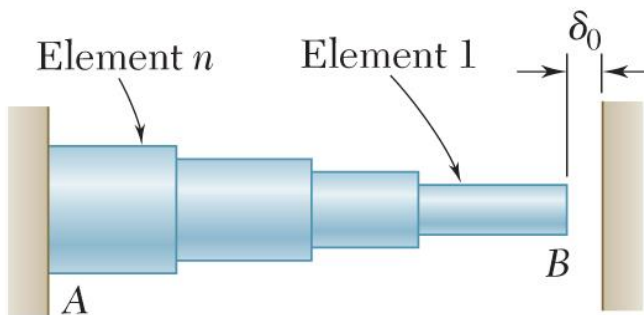


### CVEN 305 Honors - Homework #3 Supplemental Problems

- 1) Rod AB consists of  $n$  elements, each of which is homogeneous and of uniform cross-section. End A is fixed, while initially there is a gap  $\delta_0$  between end B and the fixed vertical surface on the right. The length of element  $i$  is denoted by  $L_i$ , its cross-sectional area by  $A_i$ , its modulus of elasticity by  $E_i$ , and its coefficient of thermal expansion by  $\alpha_i$ . After the temperature of the rod has been increased by  $\Delta T$ , the gap at B will close and the vertical surfaces exert equal and opposite forces on the rod. (a) Write a computer program that can be used to determine the magnitude of the reactions at A and B, the normal stress in each element, and the deformation of each element. (b) Use this program to solve the homework problems given in McGraw-Hill Connect.

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- 2) Rod AB is fixed at both ends and consists of  $n$  elements, each of which is homogeneous and of uniform cross-section. The length of element  $i$  is denoted by  $L_i$ , its cross-sectional area by  $A_i$ , its modulus of elasticity by  $E_i$ , and the load applied to its right end by  $P_i$ , the magnitude of  $P_i$  of this load being assumed to be positive if  $P_i$  is directed to the right and negative otherwise. (Note that  $P_1 = 0$ ). (a) Write a computer program that can be used to determine the reactions at A and B, the average normal stress in each element, and the deformation of each element. (b) Use this program to solve the homework problems given in McGraw-Hill Connect.

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