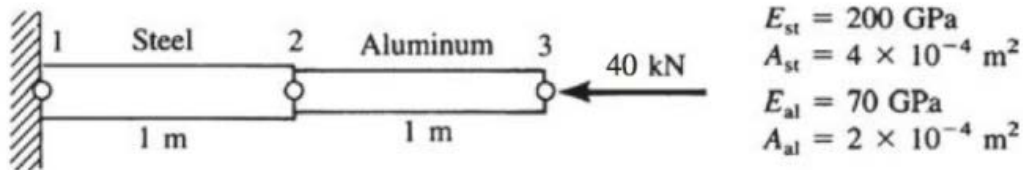


Homework Assignment #3

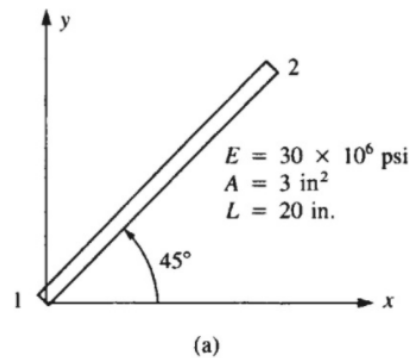
Text Problems 3.8, 15a, 18a, 23, 27, 56, 58a

3.2–3.11 For the bar assemblages shown in Figures P3–2 through P3–11, determine the nodal displacements, the forces in each element, and the reactions. Use the direct stiffness method for these problems.

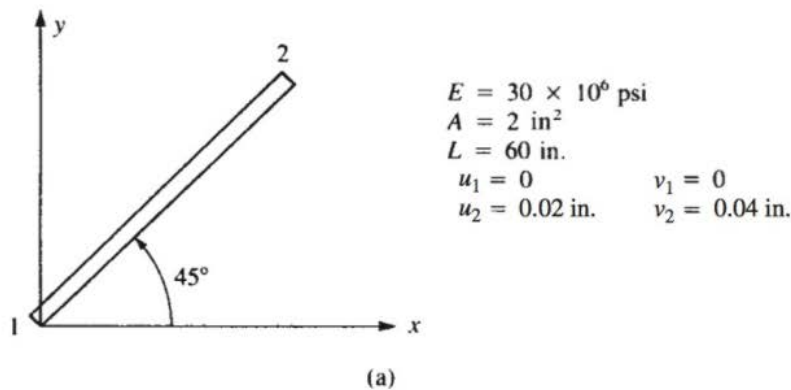


■ Figure P3–8

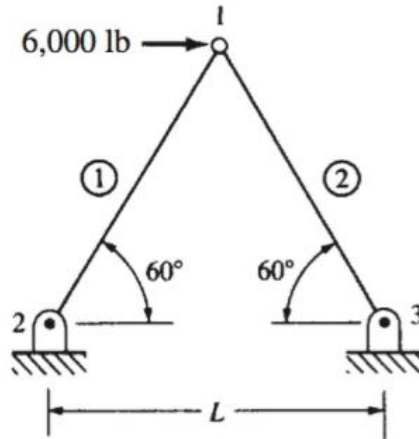
3.15 For each of the bar elements shown in Figure P3–15, evaluate the global $x - y$ stiffness matrix.



3.18 Using the method of Section 3.5, determine the axial stress in each of the bar elements shown in Figure P3–18.

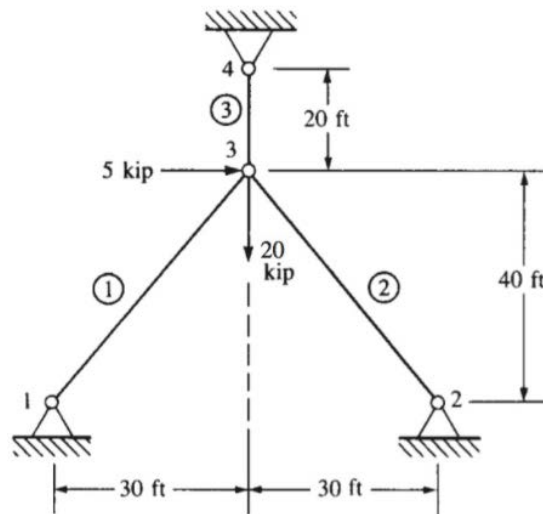


- 3.23** For the truss shown in Figure P3–23, solve for the horizontal and vertical components of displacement at node 1. Also determine the stress in element 1. Let $A = 1 \text{ in}^2$, $E = 10.0 \times 10^6 \text{ psi}$, and $L = 100 \text{ in}$.



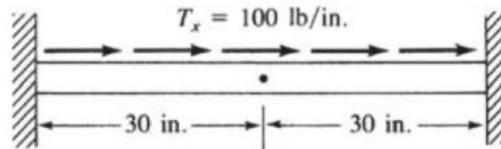
■ Figure P3–23

- 3.27** Determine the displacement components at node 3 and the element forces for the plane truss shown in Figure P3–27. Let $A = 3 \text{ in}^2$ and $E = 30 \times 10^6 \text{ psi}$ for all elements. Verify force equilibrium at node 3.



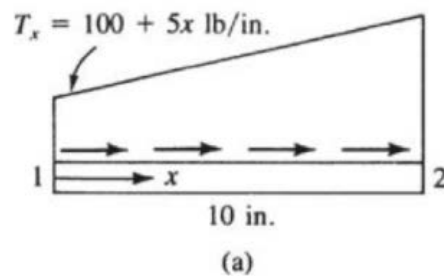
■ Figure P3–27

- 3.56** For the bar fixed at both ends and subjected to the uniformly distributed loading shown in Figure P3–56, determine the displacement at the middle of the bar and the stress in the bar. Let $A = 2 \text{ in}^2$ and $E = 30 \times 10^6 \text{ psi}$.



■ Figure P3–56

- 3.58** Determine the energy equivalent nodal forces for the axial distributed loading shown acting on the bar elements in Figure P3–58.



■ Figure P3–58