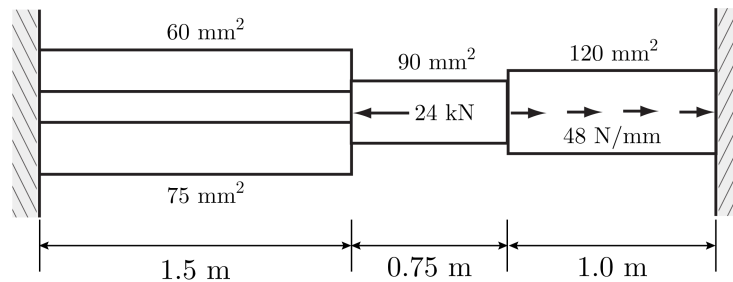


CE 525 Fall 2026 HW#1

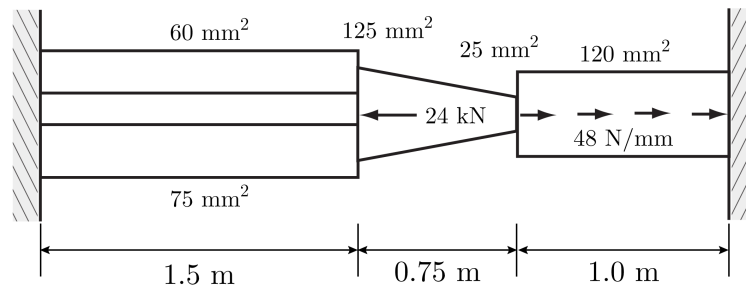
Due Thursday, September 10, by the beginning of class

1. For the uniaxial structure shown below determine joint displacements, member end forces along with axial force diagram, and external reactions using:
 - a. (5 pts) Hand calculations
 - b. (5 pts) SAP2000
 - c. (5 pts) MATLAB (or programming language of choice)



$E = 20 \text{ GPa}$ for all members

2. For the modified uniaxial structure that now contains a tapered member, determine joint displacements and external reactions using MATLAB by:
 - a. (5 pts) Deriving and implementing the exact element stiffness matrix [k]
 - b. (5 pts) Discretizing the tapered member into a series of prismatic elements using the average cross-sectional area within a segment to obtain 99% accuracy. Plot the exact versus approximated displacements for $n = 1, 2, \dots$ segments.



$E = 20 \text{ GPa}$ for all members