Midterm Exam 1 - Structural Analysis 1

Seoul National University

October 7th, 2024

Problem 1.

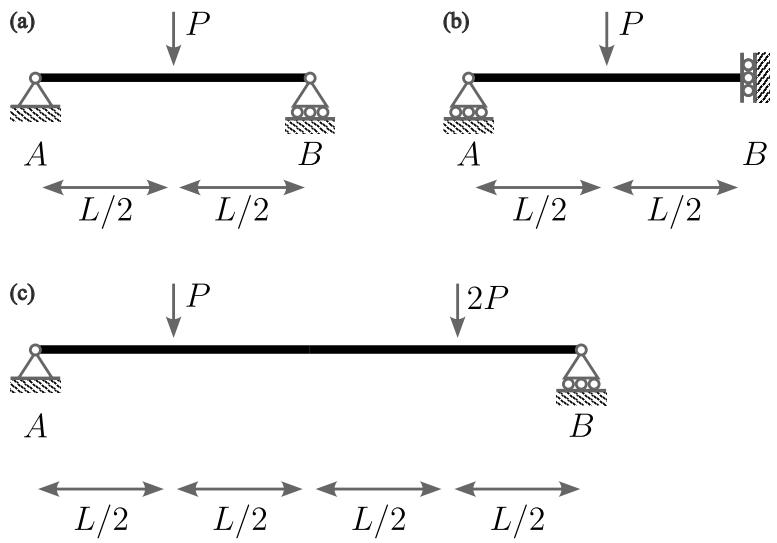
1.1 Calculate the reaction forces, and draw shear force and bending moment diagrams for the structure (a).

1.2 Calculate the reaction forces, and draw shear force and bending moment diagrams for the structure (b).

1.3 Calculate the reaction forces for the structure (c).

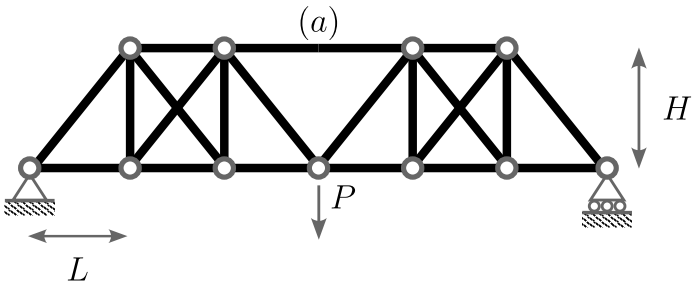
1.4 Let $\theta_B^{(a)}$ denote the slope angle at support B of structure (a), and $\delta_B^{(b)}$ denote the deflection at support B of structure (b). Then, express the deflection and the slope angle at the midpoint of structure (c) in terms of $\theta_B^{(a)}$ and $\delta_B^{(b)}$. Please avoid calculating the deflection and slope angle by directly integrating the differential equation or by applying the principle of virtual work.

All members have the same constant EI.



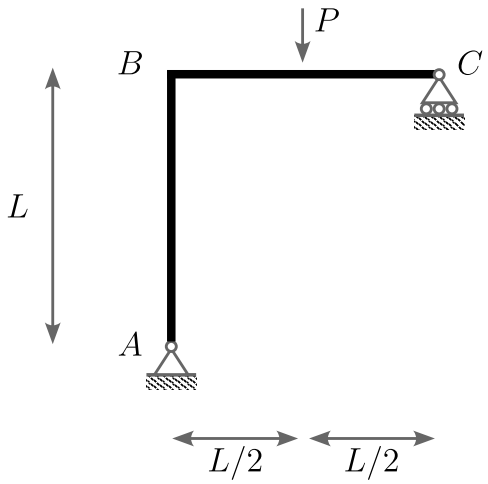
Problem 1. Structures (a), (b), and (c).

Problem 2. Given the indeterminate structure below, find the axial force in the upper middle member (a). All members have the same constant rididity EA. The lengths of all lower horizontal members are equal to L.



Problem 2.

Problem 3. Calculate the reaction forces, and draw axial force, shear force, and bending moment diagram for the structure below. Without computing the exact displacement, provide a physical explanation for the horizontal displacement at node C.



Problem 3.