

Civil Engineering I

- Introduction to structural mechanics- Application of equilibrium equations

Exercises 3

- Exercise 3.1

A straight bar AC of length l is subjected to the forces of magnitude H_A, V_A, V_C and $|\mathbf{f}| = F$ as shown in Fig.1. For given F , determine H_A, V_A and V_C assuming that the bar is in a static equilibrium.,

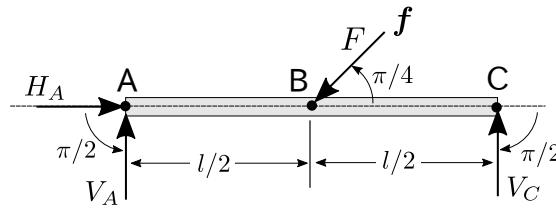


Figure 1: A straight bar AC in a static equilibrium. F, H_A, V_A, V_C and $|\mathbf{f}| = F$ denote the magnitude of applied forces.

- Exercise 3.2

A straight bar AC is supported statically as shown in Fig.2. Determine the reaction forces from the supports at A and B.

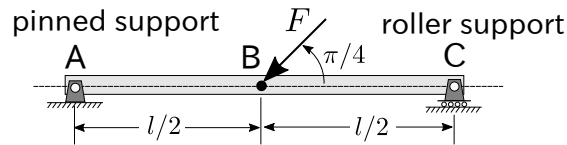


Figure 2: A simply supported bar AC subjected to an oblique force of magnitude F .

- Exercise 3.3

Consider a straight bar AB clamped rigidly by a wall as shown in Fig.3. Determine the reaction forces and moment at the fixed end A when a point force of magnitude F is applied obliquely to the right end B of the bar.

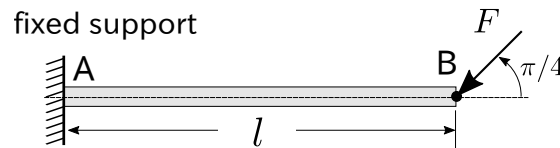


Figure 3: A bar AB connected to a fixed support. An oblique load of magnitude F is applied to the right end of the bar.

- Exercise 3.4

Examine the support conditions shown in Fig.4, and answer whether all the reaction forces and moments may be determined using only the equilibrium equations.

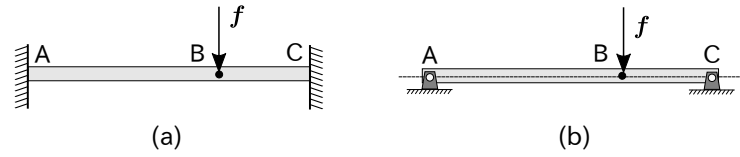


Figure 4: A straight bar connected to (a) fixed supports, and (b) pinned supports.

- Exercise 3.5

Determine the reaction forces acting to the truss structures shown in Fig.5 due to the application of the external forces of magnitude F .

- Exercise 3.6

Determine the axial forces generated in the truss structures shown in Fig.5 by the externally applied forces of magnitude F .

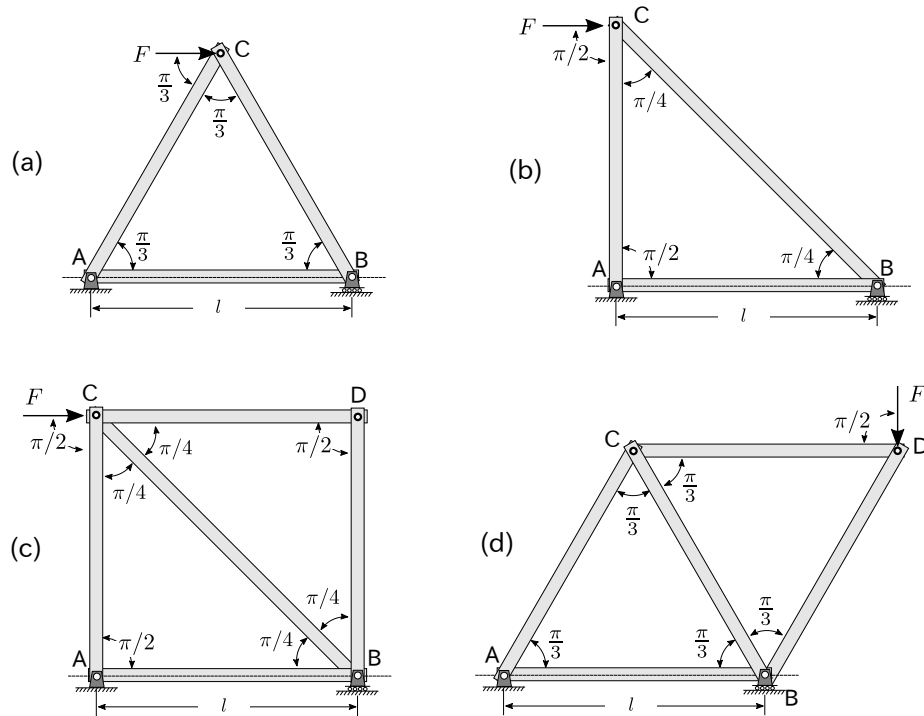


Figure 5: Simply supported truss structures.