

Civil Engineering I

- introduction to structural mechanics- Equilibrium of Force and Moment

Excercises 2

- Exercise 2-1:
Obtain moments with respect to points $P_1, P_2, \dots P_4$ due to the downward vertical force \mathbf{f} shown in Fig.1 -(a).
- Exercise 2-2:
Obtain moments with respect to points $P_1, P_2, \dots P_4$ due to the horizontal force \mathbf{f} shown in Fig.1-(b).
- Exercise 2-3:
Obtain moments with respect to points $P_2, P_3, \dots P_5$ due to the load of magnitude F acting obliquely to point P_1 as shown in Fig.2-(a).
- Exercise 2-4:
Obtain moments with respect to points $P_1, P_2, \dots P_4$ due to the force \mathbf{f} acting obliquely to point P_5 as shown in Fig.2-(b).
- Exercise 2-5:
Determine the magnitude of the force \mathbf{f} shown in Fig.3-(a) that is necessary to equilibrate the bar both in terms of the force and moment.
- Exercise 2-6:
Calculate the total force and the total moments about $P_1, P_2, \dots P_5$, to show that the bar shown in Fig.3-(b) is in an equilibrium state in terms of both the force and moment. Note that F and $F/2$ are the magnitude of the downward and upward forces applied vertically to the bar, respectively.

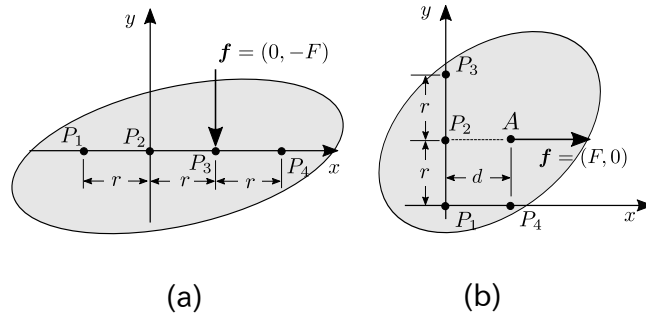


Figure 1: Vertical and horizontal forces acting on a body.

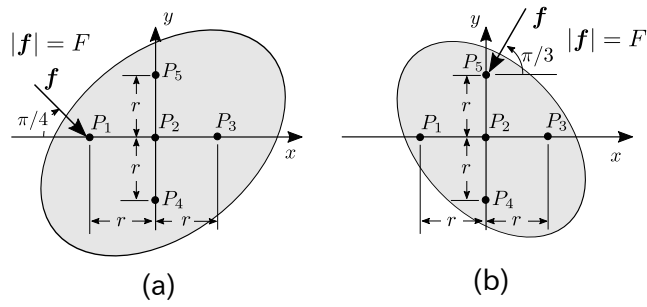


Figure 2: Forces acting obliquely to a body.

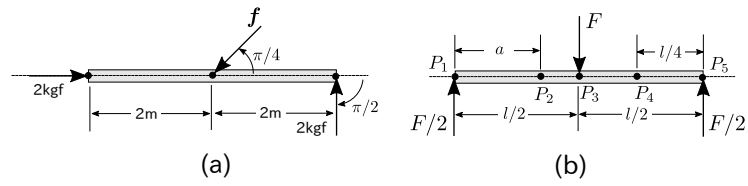


Figure 3: Straight bars subjected to a set of forces.