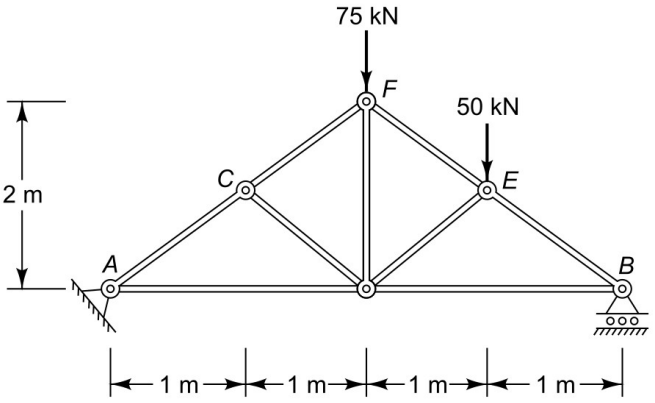
ME231: Tutorial – I

August 7, 2020

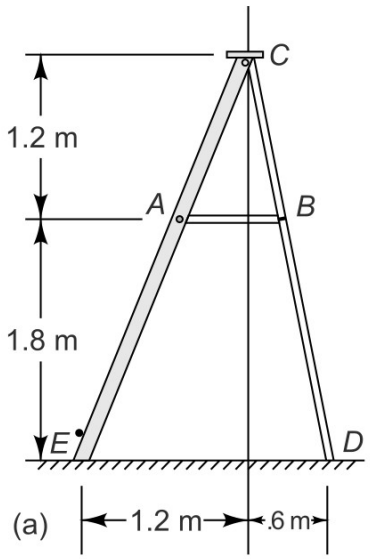
Q.1: A pinned truss is shown in equilibrium in figure. It is a plane structure consisting of relatively rigid links connected by pinned joints. It carries loads at E and F as shown; it is pinned to a rigid foundation at A and is supported on a roller support at B.

(i) Determine the forces at A and B due to the loads at E and F.

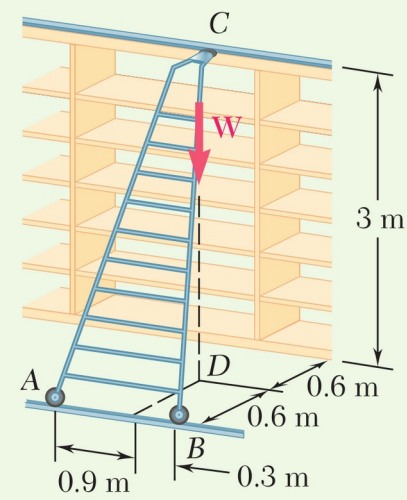
(ii) Determine the forces in the individual links of the truss.



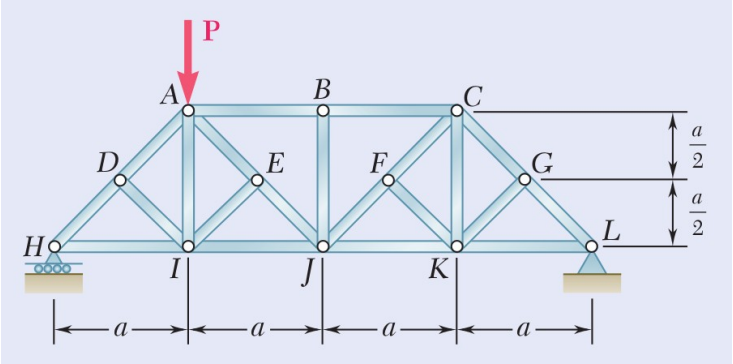
Q.2: A light step ladder is shown resting on the floor. Estimate the force in link AB when a man of weight equal to 800 N stands on top of the ladder. Assume that the bars are weighless; the pins are frictionless. First assume that the surface is smooth. Then consider friction between the ladder and the surface (coefficient of friction of 0.20). Analyze and compare the two cases.



Q:3: A 20 kg ladder used to reach high shelves in a storeroom is supported by two flanged wheels A and B mounted on a rail and by a flangeless wheel C resting against a rail fixed to the wall. An 80 kg man stands on the ladder and leans to the right. The line of action of the combined weight W of the man and ladder intersects the floor at point D. Determine the reactions at A, B, and C.

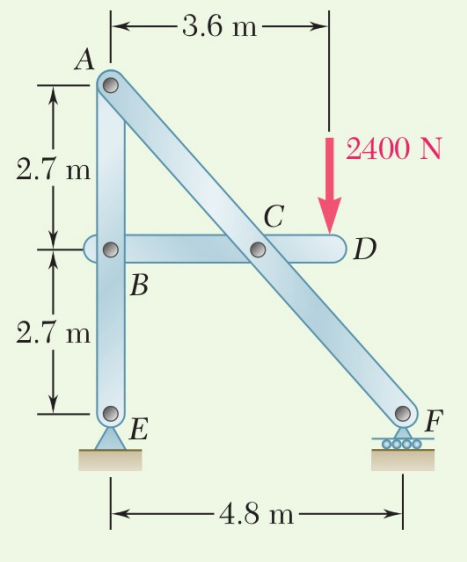


Q.4: A pinned truss is shown in equilibrium in figure. It carries loads at A as shown. it is pinned to a rigid foundation at L and is supported on a roller support at H. Determine the forces in the individual links of the truss.



Do realize that there are some links which does not carry any load. What can be said about such links? Can those links be removed from the truss?

Q.5: Determine the components of the forces acting on each member of the frame shown.



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