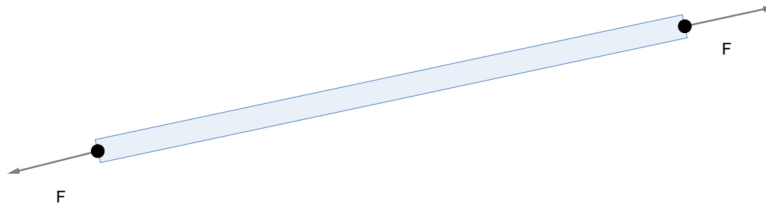


## Exercise 2.29

Kevin S. Huang

Consider a stick connected to other parts of a static system by hinges at its ends.

If the stick is massless, then the forces at the two hinges must be equal in magnitude and pointing in opposite directions so that the net force on the stick is zero. They must also lie along the same line so that the net torque on the stick is zero. This only occurs when both forces are directed along the stick.



If the stick is massive, then the vector sum of its weight and the two forces must be zero. The lines of the three forces must also be concurrent (or parallel) so that the net torque on the stick is zero. Thus, the forces at the hinges do not need to point along the stick.

