

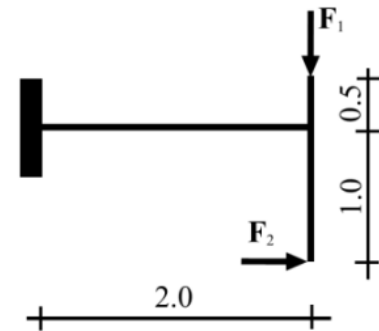
Equilibrium of planar, rigid bodies - 2.

Please solve at least 2 exercises for 2 extra points!

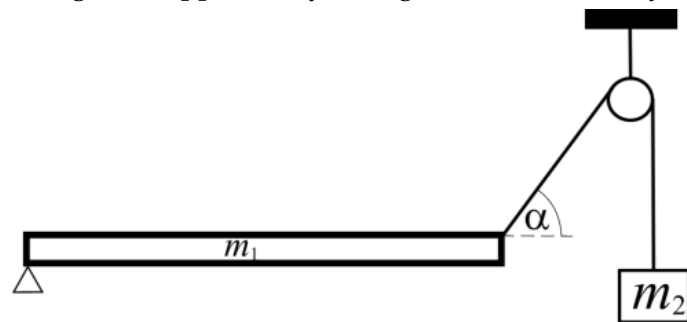
Hint: draw the free-body diagrams of the structures before calculations!

1. Determine the support reactions of the given cantilever beam (magnitude and direction)! $F_1=20$ kN and $F_2=5$ kN.

(remark: cantilever = a structure with one fixed support)



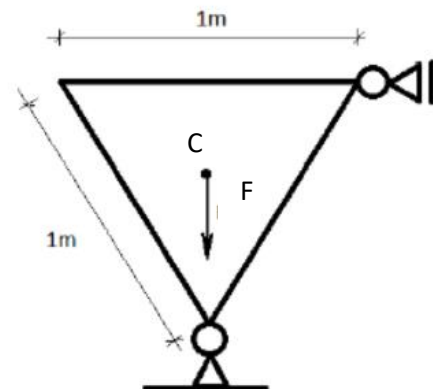
2. A homogenous bar with $m_1=40$ kg mass and 2,0 m length is supported by a hinge on the left and by a rope on the right (according to the figure). The rope is thrown across a frictionless pulley, $\alpha=30^\circ$. We assume that the weight of the bar acts in the middle of the bar as a concentrated force. At the other end of the rope another body with a mass of m_2 is hanging. Determine m_2 in case of equilibrium! Determine the support reaction in the left end of the bar! [M]



3. Consider a rigid body with an equilateral triangle shape according to the figure. It is supported by a pin support on the bottom and by a roller support on the right.

a) At first, only force F acts in the centroid of the triangular, downwards. Determine the support reactions!

b) Next, besides this vertical force we apply also another, horizontal force with the same magnitude F . Determine the support reactions in this case as well! [MM]



[M]: These examples originate from the exercise book „Moór Ágnes: Középiskolai fizikapéldatár” (Cser kiadó)

[MM]: This example is student Márk Mezei's example.