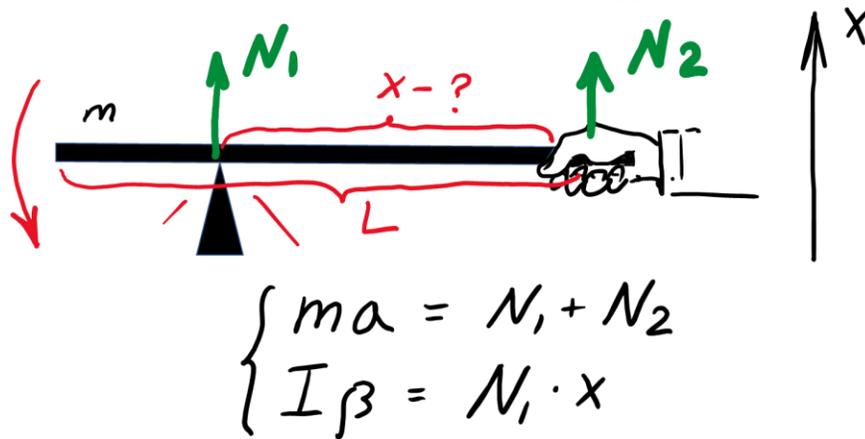


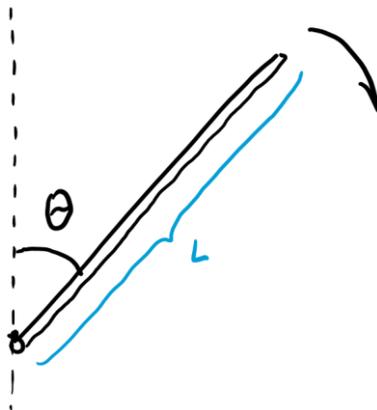
Homework 11.

Problems.

- Center of impact. Last time we started solving the problem about the “center of impact”. You were asked to find a special point at the stick: if you hit a stone with the stick you, generally, feel pain in the hand holding the stick, except the case when the point of impact is close to a special position at the stick. Find this position, marked as “x” in the Figure. Assume that the stick performs circular motion with the pivot point close to your hand. To give you initial “push” I have written 2 equations (translational and rotational) of the second Newton’s law for the moment the stick is being stopped by the stone.



- A uniform 25-cm long stick rotates freely about a horizontal axis through one of its ends. It is released at an angle  $\Theta$  to the vertical. When it hangs straight down, the speed of the tip of the stick is 3.0 m/s. How large is  $\Theta$ ? The moment of inertia of the rod with respect to one of its ends is  $mL^2/12$ .



- A uniform solid sphere rolls on a horizontal surface at 20 m/s. It then roll up the incline (see figure below). If the friction losses are negligible, what will be the value if  $h$  where the ball stops? The moment of inertia of a solid sphere about its center is  $2mR^2/5$ .

