

## Homework 12

Below are 2 rather difficult questions for the homework:

1. If you hit a stone with a long uniform stick in such a way that the impact point is close to your hand (Fig 1a) it will be sensitive.

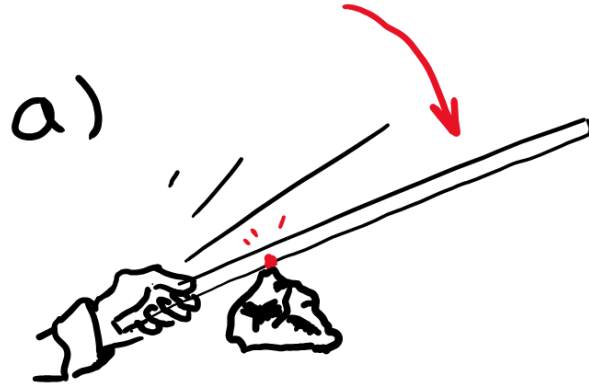


Figure 1a

It will also be sensitive if the impact point is close to the end (Fig 1b):

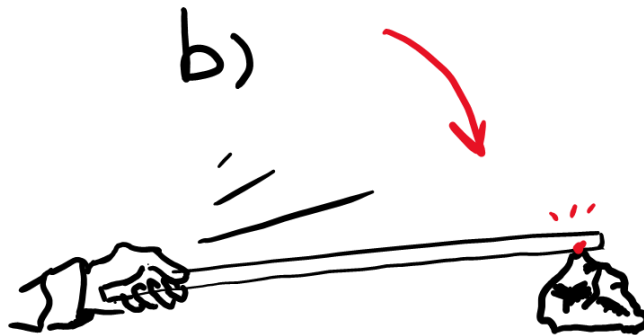


Figure 1b.

But there is a special impact point: if the stick collides with the stone at this point it will not be painful for your hand. Find this point. Consider the rod motion as rotation with the center at the rod “handle”.

2. In the previous homework problem about the girl on the swing we used conservation of the angular momentum. But this conservation law can be applied to isolated systems, but the girl on the swing is exposed to the external gravity force. Why we still can use the angular momentum conservation for this problem?