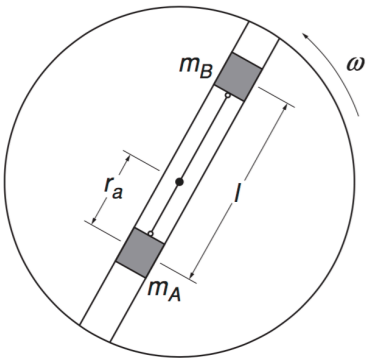
Tutorial 4

Problem 1. (K. & K. Ex. 2.15) A disk rotates with constant angular velocity ω, as shown. Two masses m_A and m_B, slide without friction in a groove passing through the center of the disk. They are connected by a light string of length ℓ, and are initially held in position by a catch, at distance r_A from the center. Neglect gravity. At $t = 0$, the catch is removed and the masses are free to slide.



1. Draw the force diagram on each mass for the moment immediately after the catch is removed,
2. Determine for this moment, the tension of the string in terms of the masses ℓ and ω,
3. Determine $\ddot{r}_A$ for this moment.

Problem 2. (K & K, Ex. 3.9) A uniform rope of mass m and length ℓ is attached to a block of mass M. The rope is pulled with force F. Find the tension at distance x from the end of the rope. Neglect gravity.