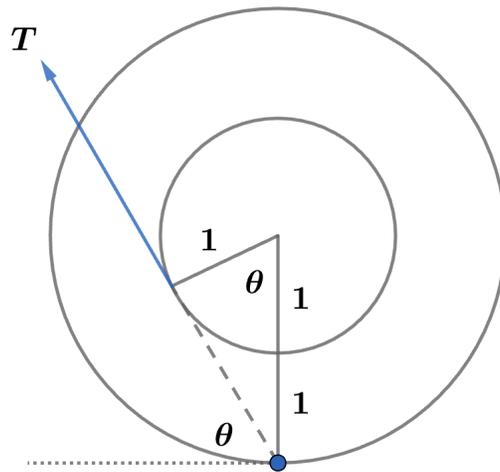# 2011 F=ma Exam: Problem 13

Kevin S. Huang

We choose the pivot point at the contact point between the disk and the ground so that gravity, normal force, and friction don't contribute to the torque.

Then, the critical angle between rolling left (at smaller angles) and rolling right (at larger angles) is where the tension force goes through the pivot point such that torque is zero. Since the tension force is always tangent to the inner circle, we have

$$\cos\theta = \frac{1}{2}$$
$$\theta = 60°$$

so the answer is $\boxed{D}$.