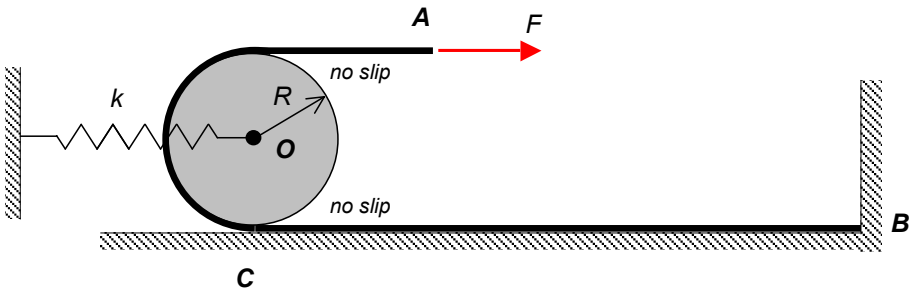
Homework H.5.G

Given: One end of an inextensible cable is attached to a rigid wall at B. This cable is wrapped around a homogeneous disk of mass m and outer radius R with the free end of the cable remaining horizontal at all times. A constant horizontal force F acts at the free end A of the cable. A spring of stiffness k is attached between the center of the disk O and ground. As the disk moves, it does not slip on the cable. The system is released from rest with the spring unstretched.

Find: Determine the speed of the center of the disk O after O has moved through a distance d to the right.



Use the following parameters in your analysis: $m = 50$ kg, $R = 0.6$ m, $k = 250$ N/m, $F = 2200$ N and $d = 1.75$ m.