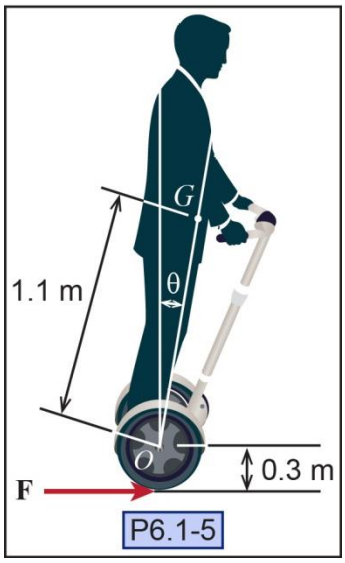
P6.1-5) The combined mass of a man and the personal transport device he is riding is 110 kg. The wheel of the device has a radius of 0.3 meters and the center of mass G of the man-device system is 1.1 meters from the center of the wheel O. The man wishes to accelerate forward at a constant 3 m/s^2 while maintaining a constant incline. Determine the incline angle θ and the traction force F that will provide the conditions desired by the rider.



P6.1-5

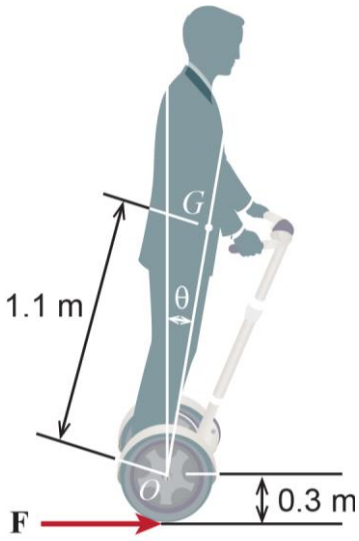
Given:

Find:

Solution:

Free-body diagram

Draw a free-body diagram of the man and transport device.



Equations of Motion

Use Newton's second law to solve for the tractive force.

F = _____

Use Euler's second law to solve for the incline angle.

θ = _____