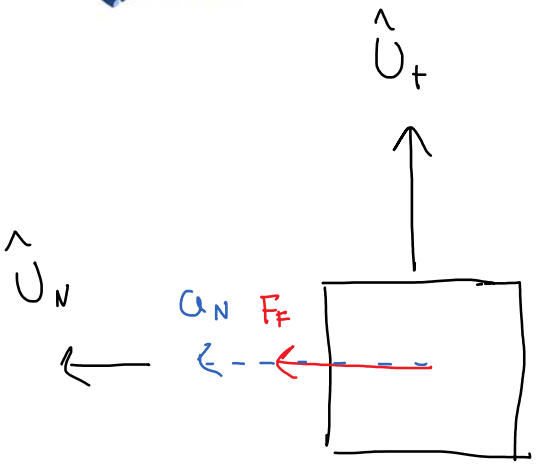
Problem 3

Kinetics with Normal Tangential Coordinates Practice Problem

- 15 kg boxes are being transported around a curve via a conveyor belt as shown to the right. Assuming the curve has a radius of 3 meters and the boxes are traveling at a constant speed of 1 meter per second. What is the minimum required coefficient of friction needed to ensure the boxes don't slip as they travel around the curve?

PennState Mont Alto



$$\sum F_z = F_g - F_N = 0$$

$$F_g = F_N = 147.15\ N$$

$$\sum F_N = F_F = m a_N$$

$$(M_s)(147.15) = (15)\left(\frac{1\ m/s^2}{3\ m}\right)$$

$$\boxed{M_s = .034}$$