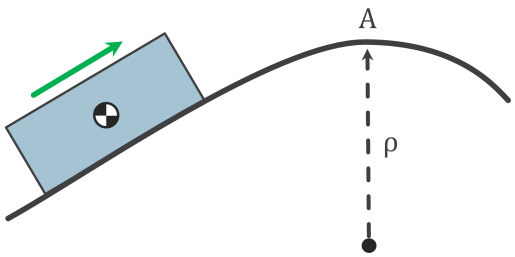
Block Sliding over Curve



Determine the maximum speed v which the sliding block may have as it passes point A without losing contact with the surface. The radius of curvature ρ at this point is 0.9 m and the gravitational acceleration g can be assumed to be 10 m/s^2.

Using known expressions:

$$\sum F_n = m \cdot a_n \tag{1}$$

Given:
Radius of curvature: $\rho = 0.9m$
Gravitational acceleration: $g = 10m/s^2$

The condition for loss of contact is that the normal force N which the surface exerts on the block goes to zero. Summing forces in the normal direction gives:

$$m \cdot g = m \cdot a_n \quad \Rightarrow \quad m \cdot g = m \cdot \frac{v^2}{\rho} \quad \Rightarrow \quad g = \frac{v^2}{\rho} \quad \Rightarrow \quad v = \sqrt{g \cdot \rho} \tag{2}$$

Filling in $\rho = 0.9m$ and $g = 10m/s^2$ results in a velocity of: $v = \sqrt{0.9 \cdot 10} = 3m/s$.