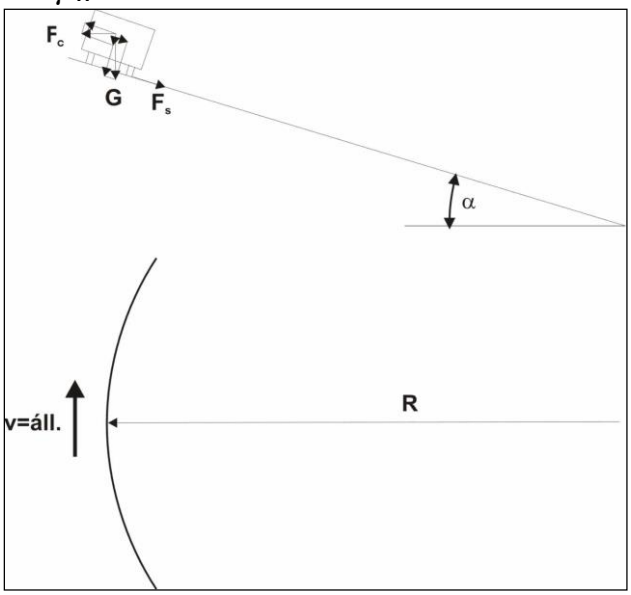
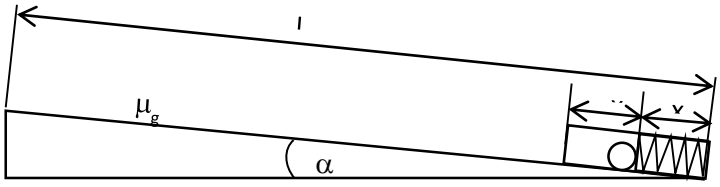
<u>Problem 6</u>: Inclined turn

On a racetrack, a car turns with constant velocity around a curvature with radius of *R*=30 m. How much is the maximum velocity with which the car can move without slipping, if the track is inclined by 15° relative to the horizontal and the rolling resistance between the road and the wheel is μ_{rr}=0.2? Draw a sketch for the solution!



<u>Problem 7</u>: Pinball shooter

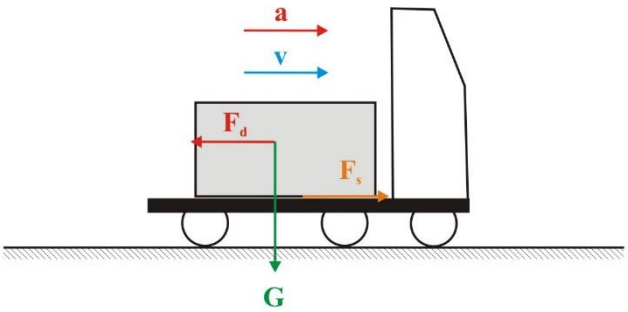
The free (unloaded) length of a spring of a pinball shooter shown in the figure is 2x=20 cm. The spring is compressed to half of its length to shoot the ball. How to choose the stiffness of the spring, if the required velocity of the ball at the top of the table is 4 m/s? The total length of the table is *l*=150 cm, its tilt angle is 10°, the rolling resistance is 0.05 and the mass of the ball is 60 g. (Neglect the length reduction due to the ball diameter, and the (angular) kinetic energy/rotational energy of the ball.)

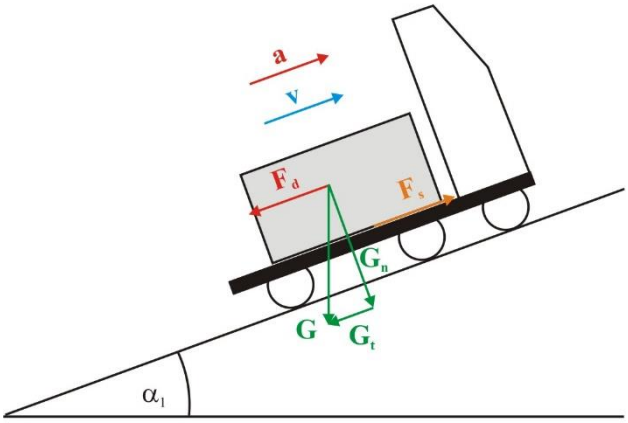


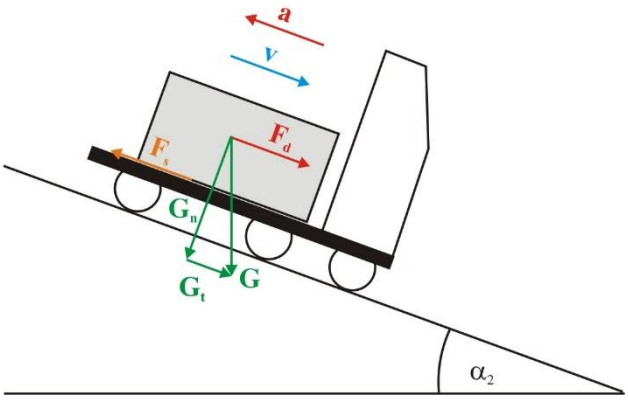
Problem 1: Acceleration and deceleration on a slope

A truck on its platform is delivering a stone block. The friction coefficient between the platform and the stone block is 0.6.

a) **How much is the maximal acceleration on a horizontal road with which the truck can start from rest to avoid slipping the stone block?**
b) **How much the maximal acceleration, if the truck moves upward on a slope with a gradient of 14%?**
c) **How steep is the slope on which the truck can stop without slipping the stone block, if the deceleration is 3 m/s^2.**







<u>Problem 5</u>: Cheese rolling competition

In a British cheese rolling competition, a regular cylindrical cheese with diameter 80 cm, and with width 20 cm, is rolled with initial velocity of 2 m/s from a 30 m height hill. The length of the hill-side is 200 m, and the rolling resistance is 0.1. Find the velocity of the cheese at the bottom of the hill!