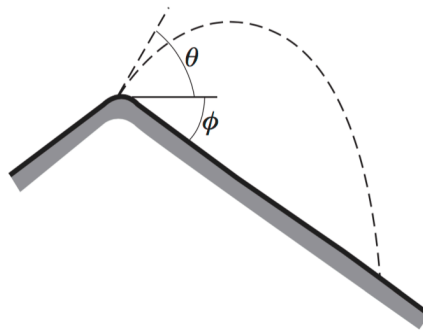


Homework 3: Kinematics

Due: Tuesday October 2, 16:00

Policy: Collaboration is allowed, but every student is required to hand in his/her own version of the solutions. Please include your name and student number on the solutions.

Problem 1. (K. & K., Ex. 1.26) An athlete stands at the peak of a hill that slopes downward uniformly at angle ϕ . See the figure. At what angle θ from the horizontal should the athlete throw a rock so that it has the greatest range? Assume a constant downward acceleration g for the rock.



Problem 2. A particle moves counter clockwise along a circle. The radius of the circle is 25 m. At time t , the length $\ell(t)$ of the travelled arc is given by

$$\ell(t) = 5t^2 - 5t.$$

1. Determine the speed, angular speed, angular acceleration and magnitude of the acceleration at time $t = 2$ s.
2. Determine also the angle between the acceleration and the position vector for time $t = 2$.