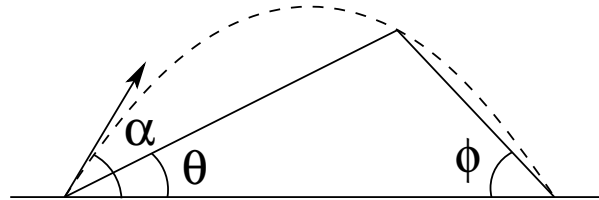## [mex140] Lowest shot to target across hill

Consider a hill consisting of two straight slopes with inclinations θ and ϕ. A projectile is fired along a parabolic trajectory from the foot of the hill on one side to the foot of the hill on the opposite side in such a way that it grazes the summit. Show that the angle of projection must be

$$\alpha = \arctan(\tan\theta + \tan\phi).$$

Hint: Introduce auxiliary variables R for the range of the shot (base of triangle) and h for the height of the hill.

Solution: