

Physics Cup – TalTech 2019 – Problem 3. February 10, 2019

An elastic ball of negligible size is dropped vertically onto a frictionless inclined plane which makes an angle α with the horizontal. Initially the distance between the plane and the ball is d and the speed of the ball is zero. The trajectory of the bouncing ball consists of parabolic arcs. Show that the foci of these parabolic arcs lie on a well-known shape, and give the parameter(s) defining this shape.

Assume that collisions are perfectly elastic and that air drag is negligible.