

CSAAPT Fall 2022 Semi-Virtual Meeting



Chesapeake Section of the
American Association of Physics Teachers
Fall 2022 Semi-Virtual Meeting
October 22, 2022 in Falls Church, VA

Contribution ID: 8

Type: **talk (15-minute)**

Optimal launch angles: Novel perspectives of an ancient problem

Saturday, October 22, 2022 10:00 AM (15 minutes)

We revisit the ancient problem of finding the optimal angle for launching a projectile so as to maximize the range. In the last meeting, we showed a solution to this problem using only geometry. Here, we present some novel perspectives. One is the notion of “duality” (between the launch and target sites). Another is the envelope of all trajectories (for launching at different angles, but with the same speed). Consequences associated with these ideas are explored. If time permits, we will show a simple, unified approach that includes launches on a spherical earth. Relying only on energy conservation and properties of ellipses/parabolas, this approach should lie within the grasp of high school students.

Primary authors: Prof. RUIZ, Michael J. (University of North Carolina at Asheville); Prof. ZIA, R. K. P. (Virginia Tech)

Presenter: Prof. ZIA, R. K. P. (Virginia Tech)

Session Classification: Morning Session (Chair: Jason Sterlace, Zoom Monitor: Juliana Butler)