PHYS 6352
February 12, 2014

Project 1

The range of a projectile is the horizontal distance from its launch point to the place it returns to the ground. The range is affected by the launch angle, the angle from the horizontal at which the projectile is launched. For level ground, in the absence of air resistance, it is well known that the range is maximum for a launch angle of 45°. When air resistance is considered, the angle for maximum range is slightly less than 45°.

In this project you will determine whether the angle is "always" less than 45° for velocity-dependent resistance. More specifically, consider a resistance that is proportional to the nth power of projectile speed. Is there any case in which the power of n, and the magnitude of the resistance leads to range being a maximum for a launch angle greater than 45°?

An important part of this investigation is to be sure that your computations are accurate enough that the angle-range dependence you see is real, and not due to truncation or roundoff error.