

**ZMATH 2011e.00781**

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**Let's do launch: More musings on projectile motion.**

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Summary: This note addresses the motion of a projectile that is launched from the top of a tower and lands on a certain mountain. The main problem is to find a manageable formula for the initial angle of elevation that maximizes the distance the projectile travels. We first explore the extent to which computer algebra systems are helpful when applied to the classical critical point approach in this context. We then show how the shortcomings of this approach can be overcome by different methods that lead to a surprisingly simple formula for the best launch angle. As an illustration, optimal home runs for the game of tee ball are discussed.

*Classification:* M50 I40

*Keywords:* mathematical applications; physics; mechanics; trajectories; maximal displacement; optimal range; parametric equations; computer algebra; critical point equation; global maximum; local maximum; completion of a square; implicit differentiation method