

PHY-421: Mechanics, UMass Amherst, Problem Set #3

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Due: Friday, Sept 18. (Late homework receives 50% credit.)

I. SLIDING PARTICLE WITH DRAG

A particle of mass m slides down an inclined plane under the influence of gravity. The particle is starting its motion from rest, and is subject to a drag force that we will model as kv or kv^2 . Find the velocity $v(t)$ and the time τ it takes to the particle to move a distance d for both cases. (In the case where the drag force is kv , you can assume that $\tau \gg m/k$ to find an explicit expression for τ .)