

[mex15] Range and duration of attenuated motion

A particle of mass m and initial velocity v_0 moves along the x -axis under the influence of a velocity-dependent attenuation force:

(a) $F(v) = -\alpha\sqrt{v}$, (b) $F(v) = -\beta v$, (c) $F(v) = -\gamma v^2$.

In each case determine the range R of the particle (maximum displacement) and the duration T of the motion before the particle comes to a stop. Note that R is finite in two cases, but T only in one case.

Solution: