

Week 23 (2/17/03)

$V(x)$ versus a hill

A bead, under the influence of gravity, slides along a frictionless wire whose height is given by the function $V(x)$. Find an expression for the bead's horizontal acceleration. (It can depend on whatever quantities you need it to depend on.)

You should find that the result is *not* the same as the \ddot{x} for a particle moving in one dimension in the potential $mgV(x)$, in which case $\ddot{x} = -gV'$. But if you grab hold of the wire, is there any way you can move it so that the bead's \ddot{x} is equal to the $\ddot{x} = -gV'$ result due to the one-dimensional potential, $mgV(x)$?