

PHYS 1410: PHYSICAL SCIENCE (FW 2012/2013)

Additional problem for Nov. 13

For the motion of an object one finds (through observation) the position-time law

$$x(t) = A \sin \omega t,$$

where A and ω are positive constants.

1. Show that the magnitude of the force F_x that accelerates the object is proportional to $|x|$.
2. Show that the potential energy function associated with this force has the form $V(x) = cx^2$. Is c a positive or a negative constant?
3. Calculate the work necessary to displace the object from $x_i = 0$ to $x_f = A$. Does the object speed up or slow down?