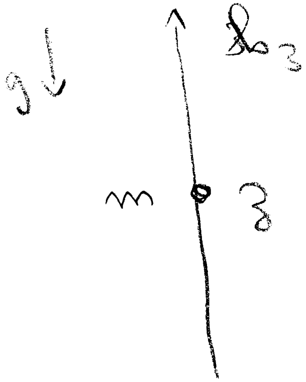


$$\begin{cases} T = \frac{1}{2} m \dot{z}^2 \\ V = m g z \end{cases} \Longrightarrow L(z, \dot{z}) = \frac{1}{2} m \dot{z}^2 - m g z$$

$$\frac{\partial L}{\partial \dot{z}} = m \dot{z}$$

$$\frac{\partial L}{\partial z} = - m g$$

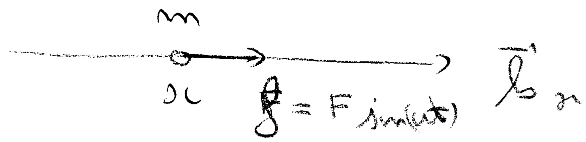
$$\frac{d}{dt} \frac{\partial L}{\partial \dot{z}} = \frac{\partial L}{\partial z} \Longrightarrow \underline{m \ddot{z} = - m g}$$

$\overline{T} = \dot{z} p - \frac{1}{2} m \dot{z}^2$ avec $\frac{\partial T}{\partial \dot{z}} = p$ soit $m \dot{z} = p$

d'où $\overline{T} = \frac{p^2}{m} - \frac{1}{2} m \left(\frac{p}{m}\right)^2 = \frac{1}{2} \frac{p^2}{m}$

et $H(z, p) = \frac{1}{2} \frac{p^2}{m} + m g z$

$$\begin{cases} \frac{d}{dt} p = - \frac{\partial H}{\partial z} \\ \frac{d}{dt} z = \frac{\partial H}{\partial p} \end{cases} \Longrightarrow \underline{\begin{cases} \frac{d p}{dt} = - m g \\ \frac{d z}{dt} = \frac{p}{m} \end{cases}}$$

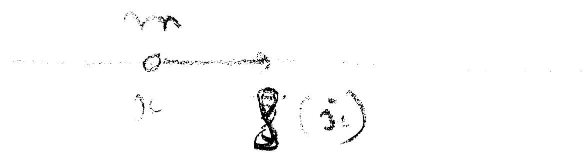


$V = -F\sin(\omega t)\,x$

$T = \frac{1}{2} m \dot{x}^2 \quad \Rightarrow \quad L = \frac{1}{2} m \dot{x}^2 + F\sin(\omega t)\,x$

$\frac{\partial L}{\partial \dot{x}} = m\dot{x}$

$\frac{\partial L}{\partial x} = F\sin\omega t \quad \Rightarrow \quad \frac{d}{dt}\frac{\partial L}{\partial \dot{x}} = \frac{\partial L}{\partial x} \quad \Rightarrow \quad m\ddot{x} = F\sin(\omega t)$



peut-on trouver $V(x)$ telle que $f(\dot{x}) = -\frac{\partial V}{\partial x}$?

non ! si on essaie $V = -f(\dot{x})\,x$ c'est une fonction de x et $\dot{x}$

si on essaie quand même d'utiliser Lagrange on trouve

$m\ddot{x} + \frac{df}{d\dot{x}}(\dot{x})\,x = f(\dot{x})$ terme en trop !