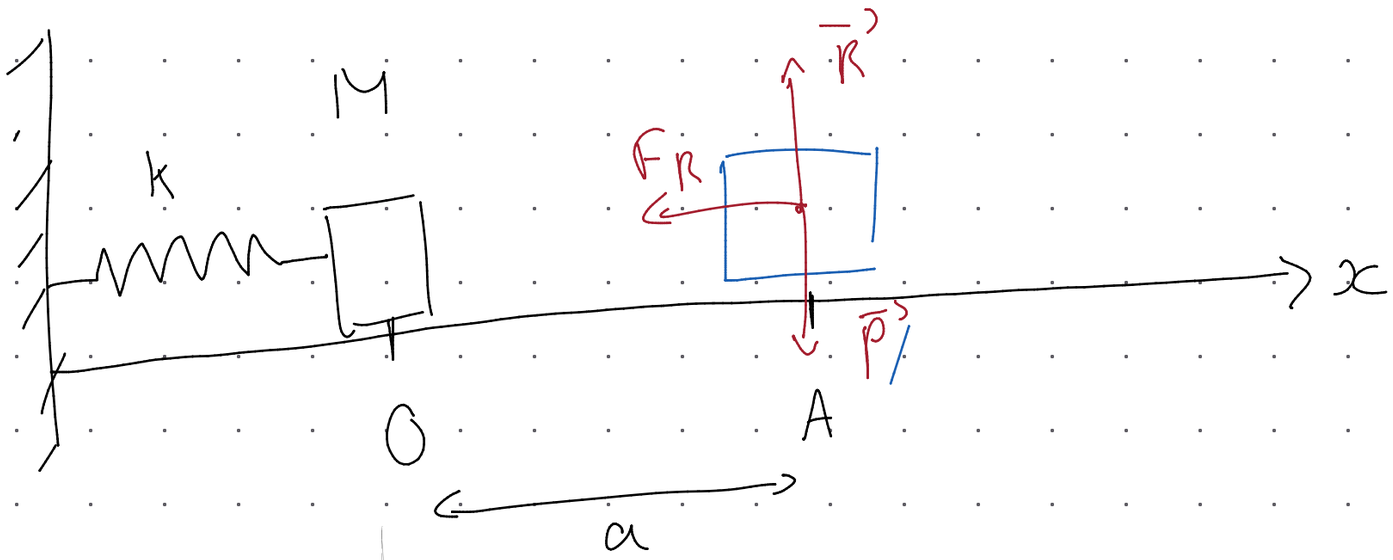

1) $\|\vec{F}_R\| = k \cdot \Delta\ell = kx_C$

$\vec{F}_R = -kx_C\vec{u}_{x_C}$ $\quad d\vec{\ell} = \vec{u}_{x_C}dx_C + \vec{u}_y dy + \vec{u}_z dz$

$$W_{AO} = \int_A^O \vec{F}_p\, d\vec{\ell} = \int_A^O -kx_C\, dx = -k\left[\frac{x_C^2}{2}\right]_A^O$$

$$W_{AO} = k\left(\frac{a^2}{2}\right)$$

2) $f = \mu mg$

Théorème de l'énergie cinétique :

$$\Delta E_C = W_{AO}$$

$$\Delta E_C = \frac{1}{2}mv_0^2 - \frac{1}{2}mv_a^2$$

$$\Leftrightarrow \frac{1}{2}mv_0^2 = k\frac{a^2}{2}$$

$$\Leftrightarrow v_0 = \sqrt{\frac{ka^2}{m}}$$

$$\Leftrightarrow v_0 = a\sqrt{\frac{k}{m}}$$

$$W_{AO} = W_{AO}(\vec{F_f}) + W_{AO}(\vec{f})$$

$$W_{AO}(\vec{f}) = \int_A^O \vec{f}\, d_{xc}\vec{i} = \mu mg \int_A^O d_{xc} = -\mu mgc$$

$$W_{AO} = \frac{kc^2}{2} - \mu mgc = \frac{1}{2} m V_0'^2$$

$$\Leftrightarrow \quad V_0' = \sqrt{\frac{kc^2}{m} - 2\mu gc}$$