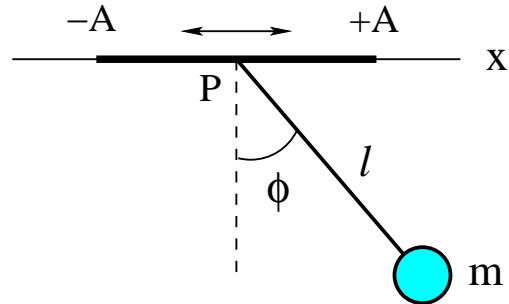


[mex248] Plane pendulum with periodically driven pivot I

Consider a mathematical pendulum (mass m , length ℓ) with the pivot P oscillating horizontally, $x_P = A \cos \omega t$. Show that the Lagrangian is

$$L = \frac{1}{2} m \ell^2 \dot{\phi}^2 + mA\omega^2 \ell \cos \omega t \sin \phi + mg\ell \cos \phi.$$



Solution: