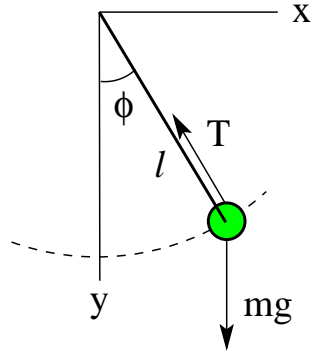


[mex134] Plane pendulum II

Derive the equation of motion $\ddot{\phi} + (g/\ell) \sin \phi = 0$ for the (generalized) angular coordinate ϕ from D'Alembert's equation,

$$(m\ddot{\mathbf{r}} - m\mathbf{g}) \cdot \delta\mathbf{r} = 0, \quad \mathbf{r} = (x, y) = (\ell \sin \phi, \ell \cos \phi).$$



Solution: