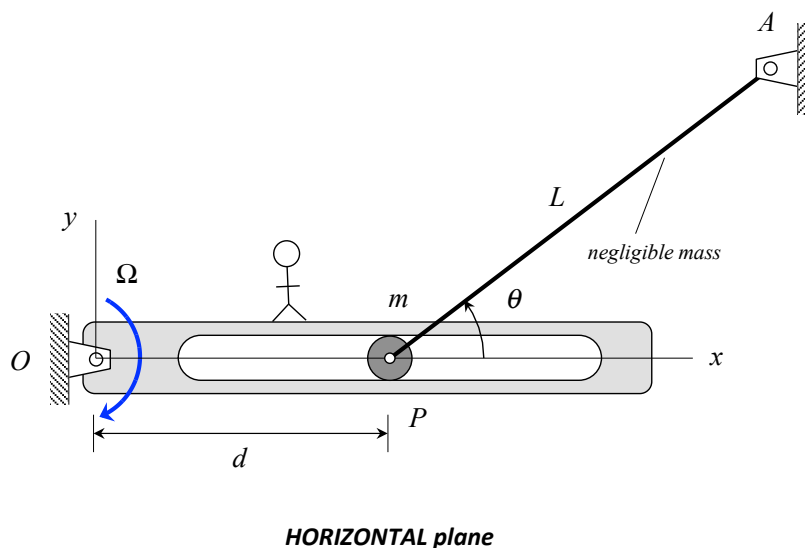


Homework H.4.E

Given: A slotted arm is rotating about end O with a constant rate of Ω . Particle P (of mass m) is attached to link AP , with the mass of AP assumed to be negligible compared to the mass of P . P is constrained to move within a smooth, straight slot. At the position of interest, AP is at an angle of θ measured counterclockwise from the slotted arm. Note that AP is a two-force member. The mechanism moves in a horizontal plane.

Find: For this position,

- Determine the velocity and acceleration of P . Write your answers as vectors, in terms of their xy coordinates. It is suggested that you use the moving reference frame equations in your analysis for the velocity and acceleration of P . Use an observer attached to the slotted arm.
- Determine the normal force acting on P and the force acting on P by link AP .



Use the following parameters in your analysis: $m = 20$ kg, $\theta = 36.87^\circ$, $d = 0.75$ m, $L = 2$ m and $\Omega = 5$ rad/s.