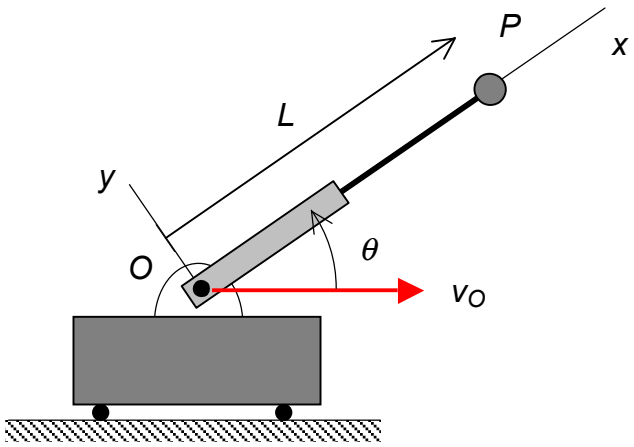
newpage **Homework H.3.A**

Given: A telescoping arm OP is pinned to a cart at end O. The cart moves along a horizontal surface with a constant speed of v_O. The angle of the arm, θ, is increasing at a constant rate of $\dot{\theta}$ and is extending at a rate of $\dot{L}$. The xyz coordinate system is attached to the telescoping arm with its origin at end O of the arm.

Find: For this problem:

(a) Determine the velocity and acceleration of particle P. Express your answers as vectors in terms of their x-y components.

(b) Make a sketch of the velocity and acceleration vectors found above.



Use the following parameters in your analysis: $\theta = 90°$, $v_O = 6$ m/s, $\dot{\theta} = 5$ rad/s, $L = 2$ m, $\dot{L} = 0$ m/s, and $\ddot{L} = 3$ m/s^2.