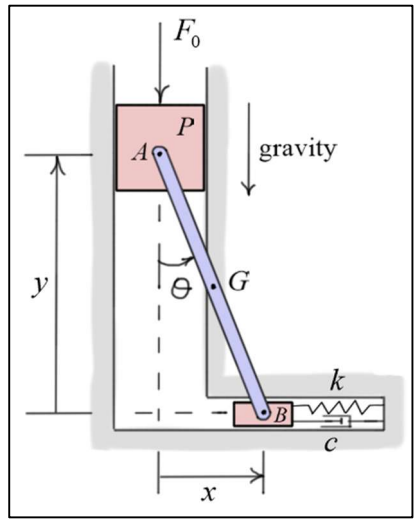
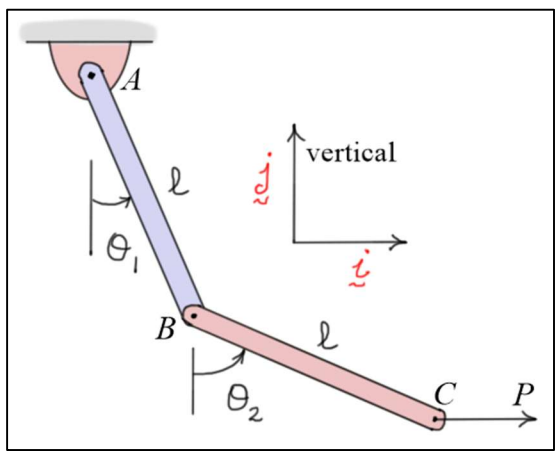
Intermediate Dynamics
Exercises #8a – Use Principle of Virtual Work

1) The system shown consists of ***slender bar*** AB of mass m and length ℓ and a ***piston*** P of mass m_p. A spring and damper are attached to the ***light slider*** at B. The spring is ***unstretched*** when $x = 0$. Find the ***vertical force*** F_0 (applied to the piston) required to hold the bar at some ***non-zero*** angle θ. Include the effects of ***gravity*** and ***neglect friction***. Use θ as the generalized coordinate.



2) The system shown consists of two pin-connected slender links each of mass m and length ℓ. The links are held in place by the weights of the two bars and the horizontal force P. Find the equilibrium angles θ_1 and θ_2 in terms of the applied force P. Use θ_1 and θ_2 as the generalized coordinates.