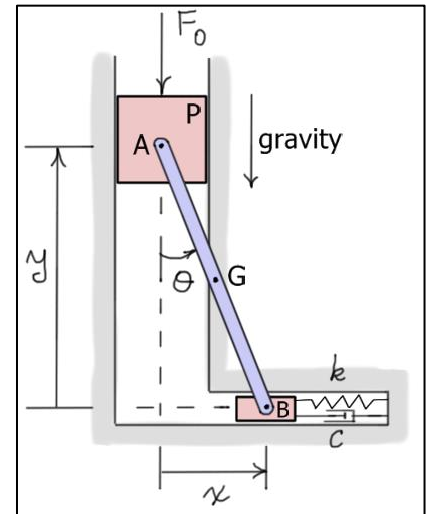


ME 5550 Intermediate Dynamics

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.

