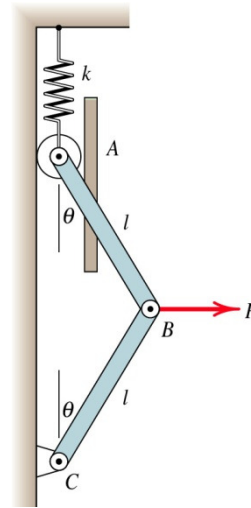
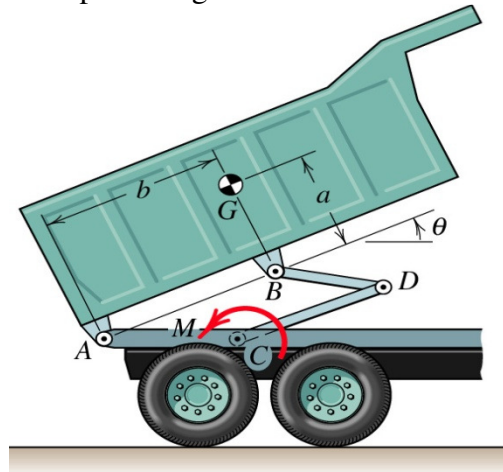


Lecture 10: Exercises

- (1) The spring of constant k is unstretched when $\theta=0$. Derive an expression for the force P required to deflect the system to an angle θ . The mass of the bars is negligible.



- (2) Determine the torque M on the activating lever of the dump truck necessary to balance the load of mass m with centre of mass at G when the dump angle is θ . the polygon $ABCD$ is a parallelogram.



- (3) The potential energy of a mechanical system is given by $V = 6x^4 - 3x^2 + 5$, where x is the position coordinate which defines the configuration of the single degree-of-freedom system. Determine the equilibrium values of x and the stability condition of each.
- (4) The bar of mass m with centre of mass at G is hinged about a horizontal axis through O . Prove the stability conditions for the two positions of equilibrium.

