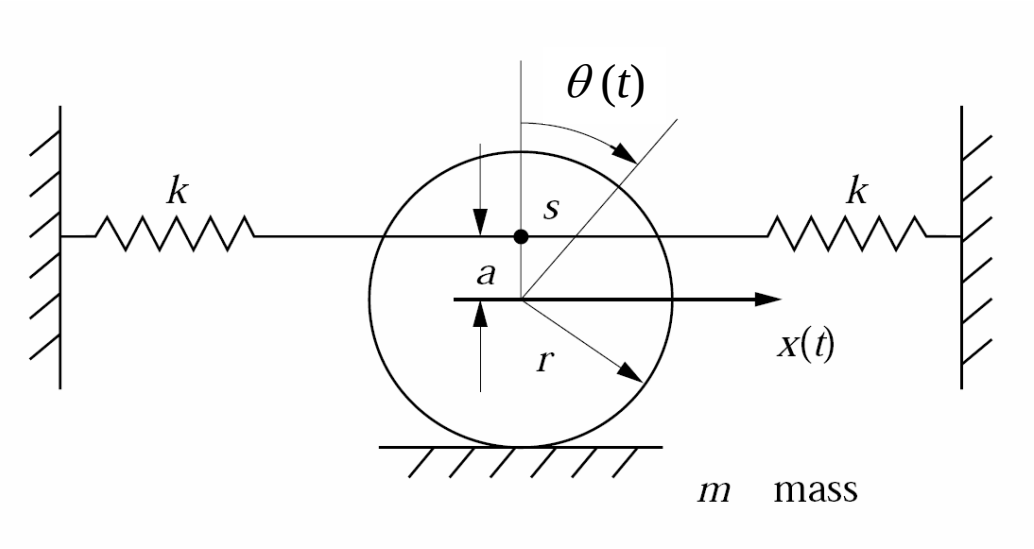
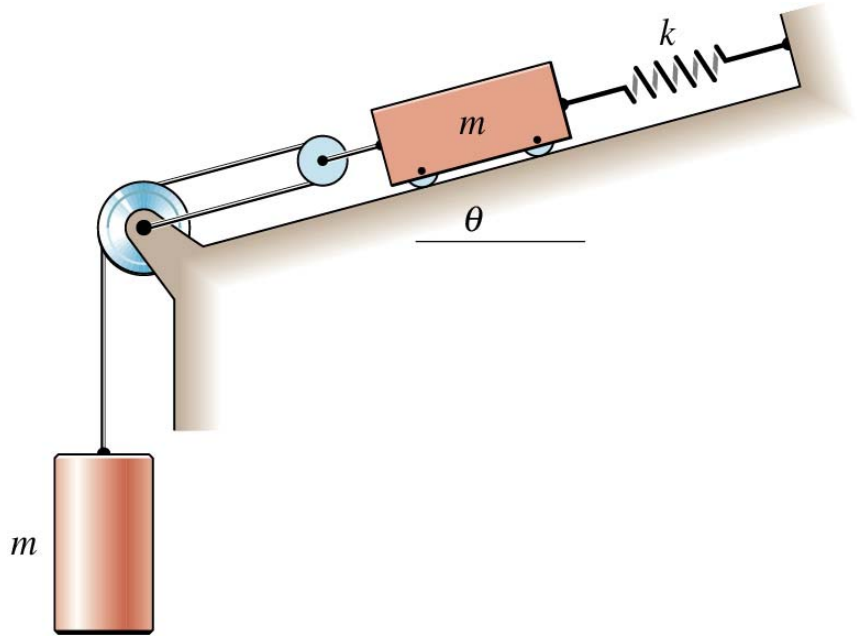
# Example (1)

Consider the disk of the figure connected to two springs. Derive EOM for small angle $\theta(t)$. [Inman/1.82]



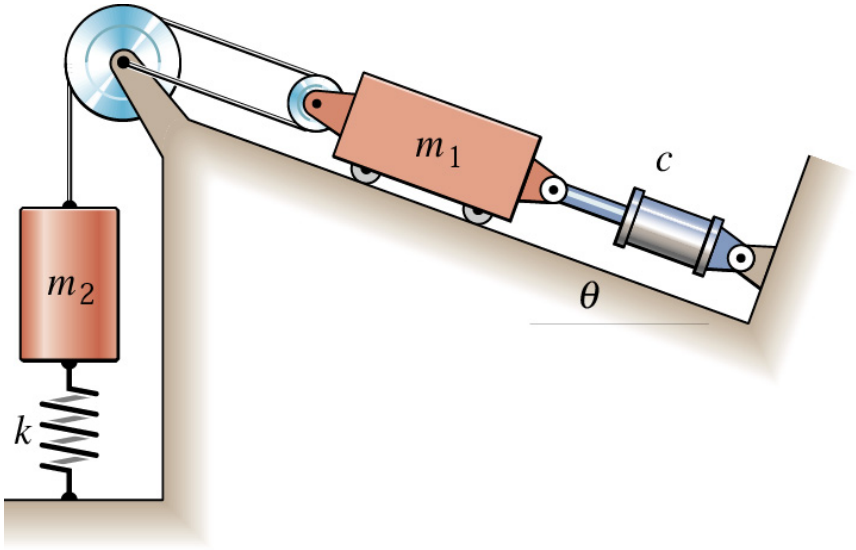
# Example (2)

Calculate the natural circular frequency $\omega_n$ of the system shown in the figure. The mass and friction of the pulleys are negligible.
[J.L. Meriam & L.G. Kraige 8/25]



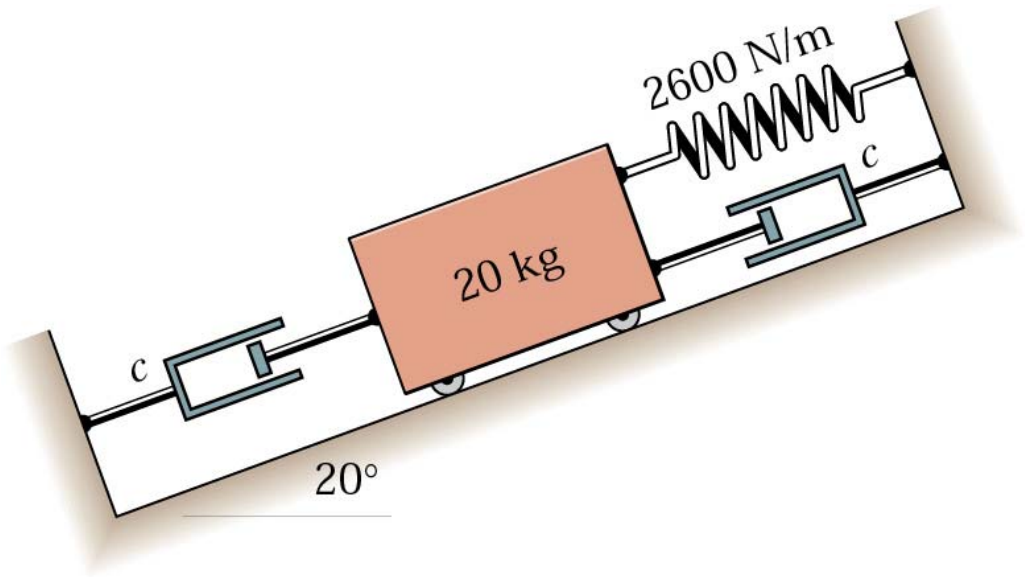
# Example (3)

Determine the damping ratio of the system depicted in the figure. The mass and friction of the pulleys are negligible, and the cable remains taut at all times.
[J.L. Meriam & L.G. Kraige 8/43]



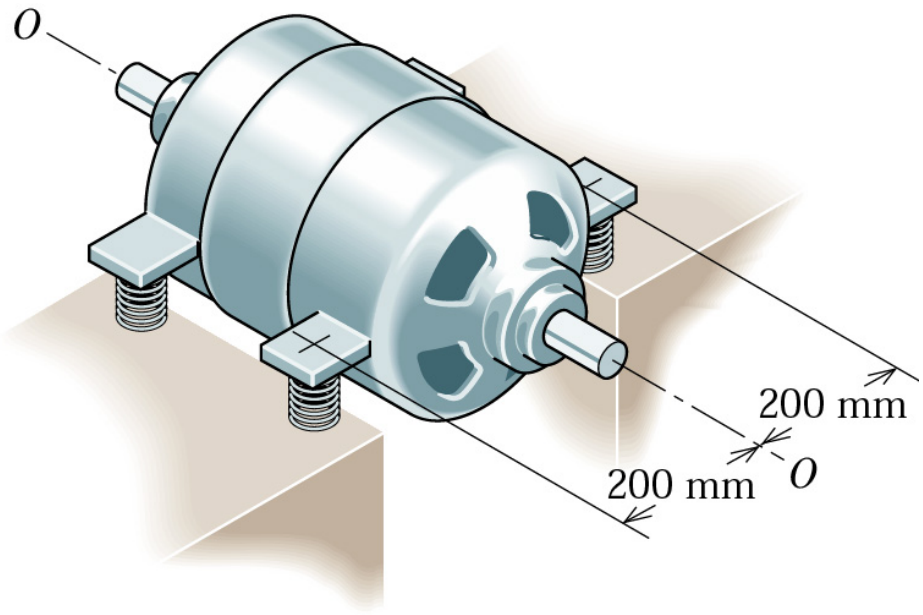
# Example (4)

Determine the value of the viscous damping coefficient c for which the system has a damping ratio of (a) 0.5 and (b) 1.5. [J.L. Meriam & L.G. Kraige 8/36]



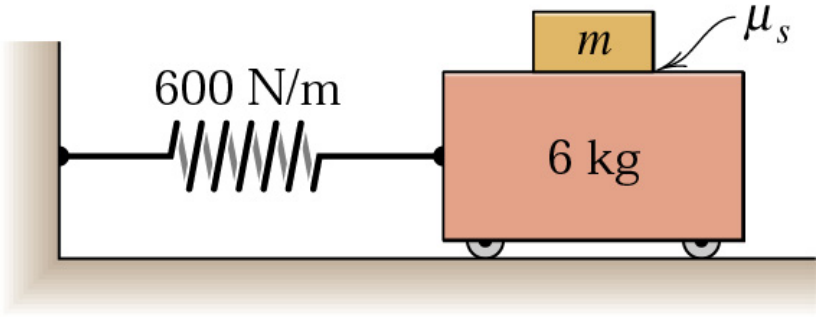
# Example (5)

The motor has a mass of 43 kg and a radius of gyration of 100 mm about O-O. If the motor has the natural frequency of free oscillation at a speed of 360 rev/min, determine the stiffness k of each of the four identical spring mounts.
[J.L. Meriam & L.G. Kraige 8/87]



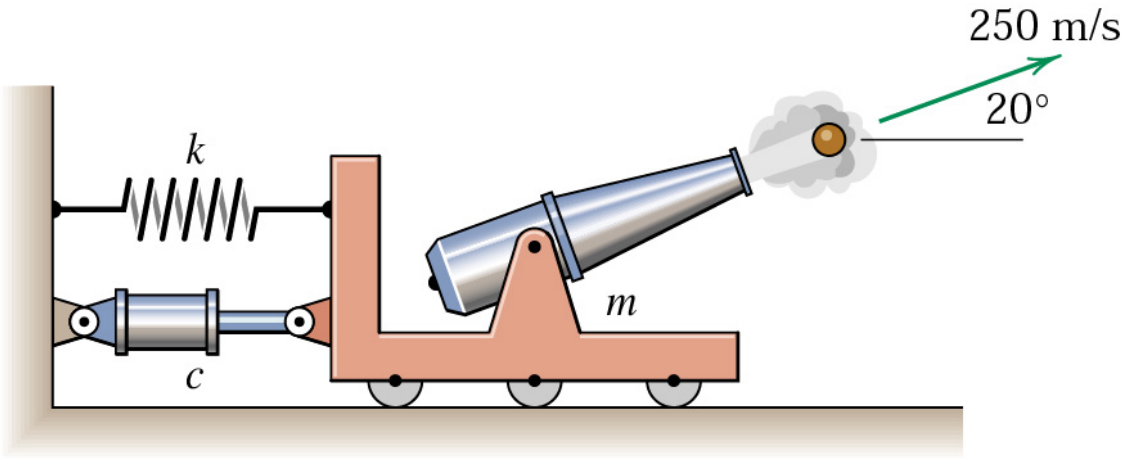
# Example (6)

With the assumption of no slipping, determine the mass m of the block which must be placed on the top of the 6-kg cart in order that the system period be 0.75 s. What is the minimum coefficient of static friction $\mu_s$ for which the block will not slip relative to the cart if the cart is displaced 50 mm from the equilibrium position and released?
[J.L. Meriam & L.G. Kraige 8/15]



# Example (7)

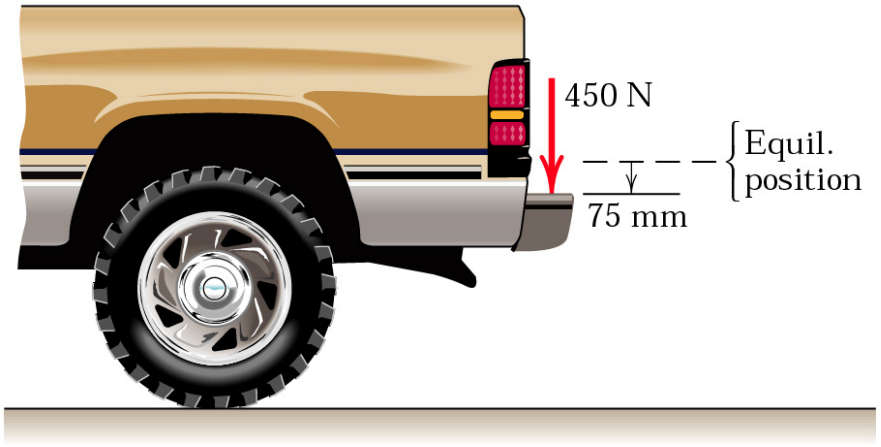
The cannon fires a 4.5-kg connonball with an absolute velocity of 250 m/s at 20º to the horizontal. The combined mass of the cannon and its cart is 750 kg. If the recoil mechanism consists of the spring of constant k = 27 kN/m and the damper with viscous coefficient c = 9000 Ns/m, determine the maximum recoil deflection $x_{max}$ of the cannon unit.
[J.L. Meriam & L.G. Kraige 8/41]



# Example (8)

Shock absorbers are tested by applying a 450-N force to the rear bumper and meas. a static deflection of 75 mm. Upon sudden release of the force, the bumper rises and then falls to a max. of 12 mm below the unloaded equilibrium position on the first rebound. Treat the action as a one-dimensional problem with an equivalent mass of half the car mass. Find damping ratio $\zeta$ for the rear end and $c$ for each shock absorber. [J.L. Meriam & L.G. Kraige 8/42]

$m_{truck}$ = 1600-kg



# Example (9)

The block of mass M is suspended by the two uniform slender rods each of mass m. Determine the natural frequency $\omega_n$ of small oscillation for the system shown.
[J.L. Meriam & L.G. Kraige 8/124]