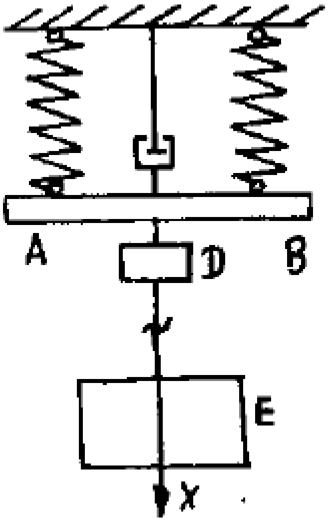
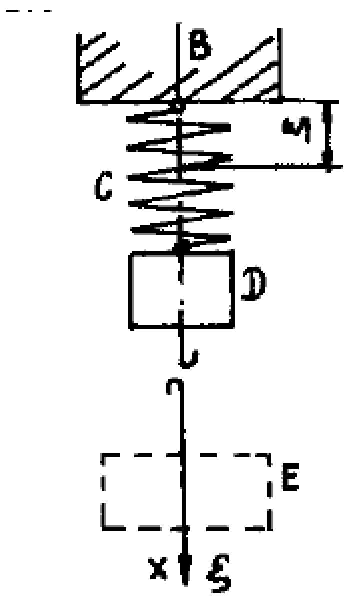
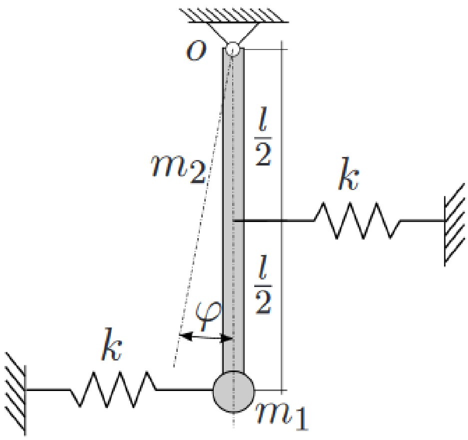
Vibrations

	Find the equation of motion for a weight D with a mass m_D. Assume the beginning of the system in the position of the rest of the load D. The static deflection of each of the two equal parallel springs under the action of weights D (m_D = 0.5 kg) and E (M_E = 1.5 kg) is λ_{st} = 4 cm. The loads are suspended by a perfectly stiff AB beam. At one point we cut the bar connecting the weights. The resistance to movement of the load D is proportional to the velocity R = 6V (in Newtons), with V the velocity (m / s). Disregard the beam and damper weights.
	Find the equation of motion for a weights D and E with a masses m_D and m_E. Assume the beginning of the system in the balance position of the loads D+E. The mass E (m_E = 2.4 kg) was suspended to a mass D (m_D = 1.6 kg) hanging on a spring with a stiffness k = 4 N/cm. Point B (upper end of the spring) starts to move according to equation ξ = 2sin5t cm (axis is vertically down). The initial position of the point on the x axis corresponds to the mean position of point B (ξ = 0).
	The construction shown in the drawing comprises a bar having a mass m_2 = 3 [kg], which is pivotally mounted, and a mass point having a mass m_1 = 2 [kg] which is attached at its second end. The springs have a stiffness k = 100 [kg / s 2], rod length L = 2 [m]. Calculate the period of vibration and write an equation of motion $\varphi(t)$ (if $\dot{\varphi}$ (t = 0) = 2, φ(t = 0) = 0). Take into account the forces of gravity, perform calculations for the so-called small angles.