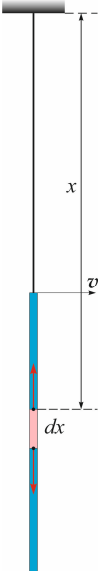


Problema 1

| Nr | Soluție | Punc taj |
|--------------|---|---|
| 1) | $T = mg$. (1 p.) | 1 p. |
| 2) | $T = 2\pi \sqrt{\frac{I}{mga}}$. (0,5 p.) $a = l + l / 2 = \frac{3}{2}l$. (0,5 p.) $I = I_c + md^2$. (0,5 p.) $d = \frac{3}{2}l$. (0,5 p.) $I_c = \frac{1}{12}ml^2$. (0,5 p.) $I_c = \frac{1}{12}ml^2 + m\left(\frac{3}{2}l\right)^2 = \left(\frac{1}{12} + \frac{9}{4}\right)ml^2 = \left(\frac{1}{12} + \frac{27}{12}\right)ml^2 = \frac{7}{3}ml^2$. (1 p.) $T = 2\pi \sqrt{\frac{7ml^2 \cdot 2}{3mg \cdot 3l}} = \frac{2\sqrt{14}}{3} \pi \sqrt{\frac{l}{g}}$. (0,5 p.) | 4 p. |
| 3) | $T = mg + F$. (0,5 p.) $dF = dma$. (1 p.) $dF = \rho S dx \omega^2 x$. (0,5 p.) $F = \rho S \omega^2 \int_l^{2l} x dx$. (0,5 p.) $F = \rho S \omega^2 \left(\frac{4l^2}{2} - \frac{l^2}{2} \right)$. (0,5 p.) $F = \rho S \omega^2 \frac{3l^2}{2}$. (0,5 p.) $F = \frac{3}{2} ml \omega^2 = \frac{3}{2} ml \frac{v^2}{l^2}$. (0,5 p.) $F = \frac{3}{2} \frac{m v^2}{l}$. (0,5 p.) $T = mg + \frac{3}{2} \frac{m v^2}{l}$. (0,5 p.) |  <p>5 p.</p> |
| Total | | 10 p. |