

5. auditorna nježba

$$z1) m = 2 \cdot 10^{-2} \text{ kg} = 0.02 \text{ kg}$$

$$k = 8 \text{ N/m}$$

$$x(t) = A \cdot \sin(\omega \cdot t)$$

$$\omega = \sqrt{\frac{k}{m}}$$

$$T_{uk} = ?$$

$$T_{uk} = 2 t_{\text{preg}} + \frac{T}{2}$$

$$T = \frac{2\pi}{\omega}$$

$$\frac{A}{2} = A \cdot \sin(\omega \cdot t_{\text{preg}}) \quad | :A$$

$$\arcsin\left(\frac{1}{2}\right) = \omega \cdot t$$

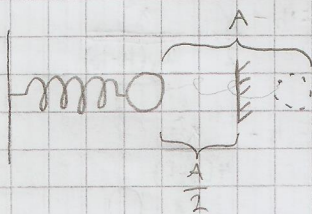
$$t_{\text{preg}} = \frac{\arcsin\left(\frac{1}{2}\right)}{\omega} = \frac{\arcsin\left(\frac{1}{2}\right)}{\sqrt{\frac{k}{m}}}$$

$$t_{\text{preg}} = \frac{\arcsin\left(\frac{1}{2}\right)}{\sqrt{\frac{8}{0.02}}} = \frac{\pi}{120} \text{ s}$$

$$T = \frac{2\pi}{\sqrt{\frac{k}{m}}}$$

$$= \frac{\pi}{10}$$

$$T_{uk} = \frac{2 \cdot \pi}{120} + \frac{\pi}{10 \cdot 2} = \frac{\pi}{15} = 0.209 \text{ s}$$



$$k_s = \frac{k_1 \cdot k_2}{k_1 + k_2}$$

$$k_s = \frac{k}{2}$$

$$k_p = k_1 + k_2$$

$$k_p = 2k$$

$$\frac{T_p}{T_s} = \sqrt{\frac{\frac{k}{2}}{2k}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

$$z5) u, \phi(x)$$

$$x > 0$$

$$E_p(x) = E_{p0} \cdot (1 - \lambda x) \cdot e^{-\lambda x}$$

$$E_{p0}, \lambda > 0, \text{ konst}$$

$$X = A = \frac{\pi}{2}$$

$$\frac{dE_p}{dx} = 0$$

$$dE_p = -E_{p0} \cdot \lambda \cdot e^{-\lambda x} + E_{p0} \cdot (1 - \lambda x) \cdot e^{-\lambda x} \cdot (-\lambda)$$

$$0 = -E_{p0} \cdot \lambda \cdot e^{-\lambda x} (1 + 1 - \lambda x)$$

$$0 = -2E_{p0} \cdot \lambda \cdot e^{-\lambda x} + E_{p0} \cdot \lambda^2 \cdot e^{-\lambda x} \cdot x \quad | : (E_{p0} \cdot \lambda \cdot e^{-\lambda x})$$

$$\lambda = 2x$$

$$x_r = \frac{2}{2}$$

$$z3) \frac{T_p}{T_s} = ?$$

$$T = \frac{2\pi}{\omega}$$

$$\omega = \sqrt{\frac{k}{m}}$$

$$\frac{2\pi\sqrt{m}}{\sqrt{k_p}} = \frac{2\pi\sqrt{m}}{\sqrt{k_s}}$$

