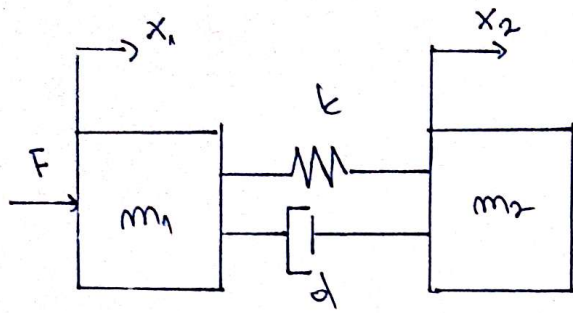


4. Zadatak Miš 2025.



$$F = 1 \text{ [N]}$$

$$m_1 = 7 \text{ [kg]}$$

$$m_2 = 4 \text{ [kg]}$$

$$k = 3 \text{ [N/m]}$$

$$d = 2 \text{ [Ns/m]}, \text{ početni uslovi su nulti.}$$

a)

$$-m_1 x_1'' - d(x_1' - x_2') - k(x_1 - x_2) + F = 0$$

$$-m_2 x_2'' - d(x_1' - x_2') - k(x_1 - x_2) = 0$$

$$-m_1 x_1'' - d(x_1' - x_2') - k(x_1 - x_2) = -F$$

$$-m_2 x_2'' - d(x_1' - x_2') - k(x_1 - x_2) = 0$$

$$m_1 x_1'' + d(x_1' - x_2') + k(x_1 - x_2) = F \quad | : m_1$$

$$m_2 x_2'' + d(x_1' - x_2') + k(x_1 - x_2) = 0 \quad | : m_2$$

$$x_1'' + \frac{d}{m_1} (x_1' - x_2') + \frac{k}{m_1} (x_1 - x_2) = \frac{F}{m_1}$$

$$x_2'' + \frac{d}{m_2} (x_1' - x_2') + \frac{k}{m_2} (x_1 - x_2) = 0$$

$$x_1'' + \frac{2}{7} (x_1' - x_2') + \frac{3}{7} (x_1 - x_2) = \frac{1}{7}$$

$$x_2'' + \frac{1}{2} (x_1' - x_2') + \frac{3}{4} (x_1 - x_2) = 0$$

$$x_1'' + \frac{2}{7} x_1' - \frac{2}{7} x_2' + \frac{3}{7} x_1 - \frac{3}{7} x_2 = \frac{1}{7}$$

$$x_2'' + \frac{1}{2} x_1' - \frac{1}{2} x_2' + \frac{3}{4} x_1 - \frac{3}{4} x_2 = 0$$

~~$$x_1(s) + \frac{2}{7} x_1(s) - \frac{2}{7} x_2(s) + \frac{3}{7} x_1(s) - \frac{3}{7} x_2(s) = \frac{1}{7s}$$~~

~~$$x_2(s) + \frac{1}{2} x_1(s) - \frac{1}{2} x_2(s) + \frac{3}{4} x_1(s) - \frac{3}{4} x_2(s) = 0$$~~

$$s^2 x_1(s) + \frac{2}{7} s x_1(s) - \frac{2}{7} s x_2(s) + \frac{3}{7} x_1(s) - \frac{3}{7} x_2(s) = \frac{1}{7s}$$

$$s^2 x_2(s) + \frac{1}{2} s x_1(s) - \frac{1}{2} s x_2(s) + \frac{3}{4} x_1(s) - \frac{3}{4} x_2(s) = 0$$

$$x_1(s) \left(s^2 + \frac{2}{7} s + \frac{3}{7} \right) + x_2(s) \left(-\frac{2}{7} s - \frac{3}{7} \right) = \frac{1}{7s}$$

$$x_1(s) \left(\frac{1}{2} s + \frac{3}{4} \right) + x_2(s) \left(s^2 - \frac{1}{2} s - \frac{3}{4} \right) = 0$$

$$D = \begin{vmatrix} s + \frac{2}{7}s + \frac{3}{7} & -\frac{5}{7}s - \frac{3}{7} \\ \frac{1}{2}s + \frac{3}{4} & s - \frac{1}{2}s - \frac{3}{4} \end{vmatrix} = \left(s + \frac{2}{7}s + \frac{3}{7} \right) \left(s - \frac{1}{2}s - \frac{3}{4} \right) + \left(\frac{2}{7}s + \frac{3}{7} \right) \left(\frac{1}{2}s + \frac{3}{4} \right)$$

$$= \frac{28s^2 - 65s^2 - 95^2}{28}$$

$$D_1 = \begin{vmatrix} \frac{1}{75} & -\frac{2}{7}s - \frac{3}{7} \\ 0 & s - \frac{1}{2}s - \frac{3}{4} \end{vmatrix} = \frac{1}{75} \left(s - \frac{1}{2}s - \frac{3}{4} \right) = \frac{4s^2 - 25 - 3}{285}$$

$$D_2 = \begin{vmatrix} s + \frac{2}{7}s + \frac{3}{7} & \frac{1}{75} \\ \frac{1}{2}s + \frac{3}{4} & 0 \end{vmatrix} = -\frac{1}{75} \left(\frac{1}{2}s + \frac{3}{4} \right) = \frac{-25 - 3}{285}$$

$$X_1 = \frac{D_1}{D} = \frac{\frac{4s^2 - 25 - 3}{285}}{\frac{28s^2 - 65s^2 - 95^2}{28}} = \frac{4s^2 - 25 - 3}{28s^2 - 65s^2 - 95^2}$$

$$X_2 = \frac{D_2}{D} = \frac{\frac{-25 - 3}{285}}{\frac{28s^2 - 65s^2 - 95^2}{28}} = \frac{-25 - 3}{28s^2 - 65s^2 - 95^2}$$