

I

$$\bullet u(x) = \lambda(x) + \omega(x) \sum_{k=0}^{\infty} c_k x^k$$

- Robin ~~počti~~: - $u(x=0) = \varphi$
- $u(x=L) = \Delta L$

$$\Delta T(x) = \alpha T_0 \left(\frac{x}{L}\right)^3$$

$$u(x) = \lambda(x) + \omega(x) \sum_{k=0}^{\infty} c_k x^k$$

$$\bullet u = \varphi \rightarrow \sum_{k=0}^{\infty} c_k x^k = c_0$$

$$\bullet \text{Sledí: } \lambda(x) = x \frac{\Delta L}{L}$$

$$\omega(x) = x(x-L)$$

$$\bullet u(x) = x \frac{\Delta L}{L} + x(x-L) C_0$$

$$\frac{du(x)}{dx} = \frac{\Delta L}{L} + (2x-L) C_0$$

$$\frac{d^2 u(x)}{dx^2} = \varphi + 2C_0 \rightarrow \frac{d^2 u(x)}{dx^2} = 2C_0$$

$$\bullet \frac{d u(x)}{dx} = \alpha \Delta T(x)$$

$$\frac{d^2 u(x)}{dx^2} = \alpha \frac{d \Delta T(x)}{dx} = \alpha \Delta T_0 \cdot 3 \frac{x^2}{L^3}$$

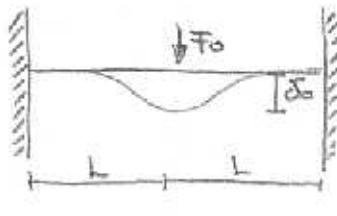
• Zapišme:

$$\frac{d^2 u(x)}{dx^2} = \frac{d u^2(x)}{dx^2}$$

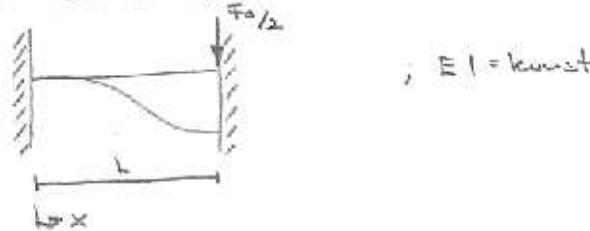
$$2C_0 = \alpha \Delta T_0 \cdot 3 \frac{x^2}{L^3}; \quad C_0 = \alpha \Delta T_0 \cdot \frac{3}{2} \frac{x^2}{L^3}, \quad C_0(x=L) = \alpha \Delta T_0 \cdot \frac{3}{8} \frac{1}{L}$$

$$\boxed{u(x) = x \frac{\Delta L}{L} + x(x-L) \alpha \Delta T_0 \cdot \frac{3}{8} \frac{1}{L}}$$

II. Štenu model:



Sistem koliko rezljiva poenostavljen, ker je simetričen:



; $EI = \text{konst}$

- Rombi pogaji:

$$w(\alpha = \infty) = \delta_0 \quad \checkmark$$

$$w'(x = \infty) = 0 \quad \checkmark$$

$$w(x = L) = \delta_0$$

$$w'(x = L) = 0 \quad \checkmark$$

$$T(x = L) = -\frac{F_0}{2} \quad \checkmark$$

$$\bullet w(x) = \lambda(x) + w(\infty) \sum_{k=0}^{\infty} c_k x^k$$

$$\lambda(x = \infty) = \infty$$

$$w(x = \infty) = \delta_0$$

$$\lambda(x = L) = \delta_0$$

$$w(x = L) = \delta_0$$

; $N=25$

$$\begin{aligned} & \lambda(x) = \frac{\delta_0}{L} x \\ \Rightarrow & \lambda(x) = \frac{\delta_0}{L} x^2 \end{aligned}$$

$$\Rightarrow \lambda(x) = x^2 (\infty - L)$$

$$\bullet w(x) = x \frac{\delta_0}{L} + x^2 (\infty - L) C_0$$

$$w'(x) = \frac{\delta_0}{L} + (3x^2 - 2\infty L) C_0$$

$$w''(x) = \infty + (6x - 2L) C_0$$

$$w'''(x) = 6 C_0$$

$$\bullet w'''(x) = -\frac{1}{EI} T(x)$$

$$w'''(x=L) = -\frac{1}{EI} T(x=L) = +\frac{1}{EI} \frac{F_0}{2}$$

- Zapišemo:

$$w'''(x) = w'''(L)$$

$$6 C_0 = \frac{F_0}{2EI}, \quad C_0 = \frac{F_0}{12EI}$$

- Sledi:

$$w'(x=L) = 0$$

$$0 = \frac{\delta_0}{L} + (3L^2 - 2L^2) \frac{F_0}{12EI}$$

$$-\frac{\delta_0}{L} = \frac{L^2 F_0}{12EI} \rightarrow F_0 = -\frac{\delta_0 \cdot 12EI}{L^3}$$

$$w(x) = x^2 \frac{\delta_0}{L} + x^2 (\infty - L) C_0$$

$$w(x) = 2x \frac{\delta_0}{L} + (3x^2 - 2\infty L) C_0$$

$$w''(x) = 2 \frac{\delta_0}{L} + (6x - 2L) C_0$$

$$w''(x) = 0 + 6 C_0$$

$$w'''(x) = -\frac{1}{EI} T(x)$$

$$w'''(x=L) = -\frac{1}{EI} T(x=L) = \frac{F_0}{2EI}$$

- Zapišemo:

$$w''(x) = w''(L)$$

$$6 C_0 = \frac{F_0}{2EI} \Rightarrow C_0 = \frac{F_0}{12EI}$$

- Sledi:

$$w(x=L) = 0$$

$$2\delta_0 L + (3L^2 - 2L^2) C_0 = 0$$

$$2\delta_0 L + L^2 \frac{F_0}{12EI} = 0$$

$$\Rightarrow F_0 = -\frac{2\delta_0 \cdot 12EI}{L^3}$$

$$F_0 = -\frac{24EI\delta_0}{L^3}$$

✓