

SAVIJANJE KRUZNE CILINDRICNE LJUSKE PRI ROTACIONO SIMETRICNOM OPTERECENJU

-uslovi ravnoteze-

$$(1) dM - T_x = 0$$

$$(2) \frac{Nj}{a} + \frac{dT}{dx} + Z = 0$$

$$DJ : \frac{d^4 w}{dx^4} + 4b^4 w = \frac{Z}{K}$$

-deformacija-

$$e_{xz} = -\frac{d^2 w}{dx^2} z + \frac{du}{dx}$$

imamo sile: M_x, T_x, Nj, Mj
 $Nj_x = Tj = Nj = Mj$

$$e_j z = -\frac{w}{a}$$

$$M_x = -K \frac{d^2 w}{dx^2}; Nj = -Eh \frac{w}{a}$$

$$T_x = \frac{dM_x}{dx}$$

$$w = w_0 + e^{bx} (C1 \cos bx + C2 \sin bx) + e^{-bx} (C3 \cos bx + C4 \sin bx)$$

-duga cilindricna ljuska- ($\beta \cdot l \geq 5$)

$$b = \sqrt[4]{\frac{3(1-\nu^2)}{a^2 h^3}}$$

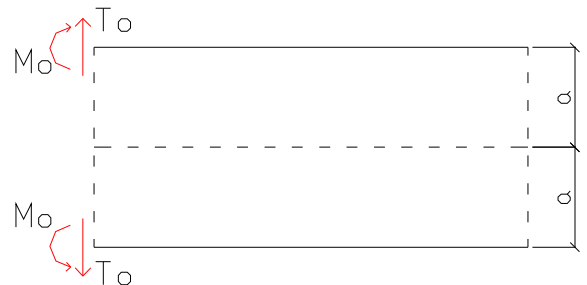
$$w = w_0 - \frac{1}{2b^3 K} e^{-bx} [(T_0 + M_0 b) \cos bx - M_0 \sin bx]$$

$$\frac{dw}{dx} = \frac{1}{2b^2 K} e^{-bx} [2bM_0 \cos bx + T_0 (\cos bx + \sin bx)]$$

$$\frac{d^2 w}{dx^2} = -\frac{1}{bK} e^{-bx} [bM_0 (\cos bx + \sin bx) + T_0 \sin bx]$$

$$\frac{d^3 w}{dx^3} = \frac{1}{K} e^{-bx} [2bM_0 \sin bx - T_0 (\cos bx - \sin bx)]$$

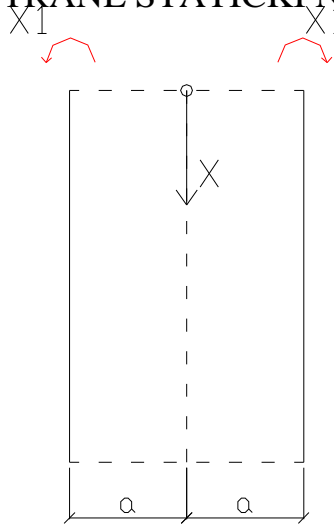
$$w_0 = -\frac{Z(x)a^2}{Eh}$$



<KOORDINATA X SE MERI SA STRANE STATICKI NEPOZNATIH Xi
STANJE X1=1(moment):

$$Ed_{11} = E \left(\frac{dw}{dx} \right)_{(x=0)} = E \frac{1}{bK}$$

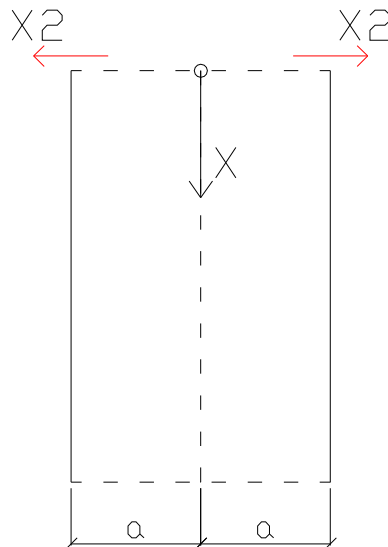
$$Ed_{21} = Ew_{(x=0)} = E \frac{1}{2b^2 K}$$



STANJE X2=1(sila):

$$Ed_{22} = Ew_{(x=0)} = E \frac{1}{2b^3 K}$$

$$Ed_{12} = E \left(\frac{dw}{dx} \right)_{(x=0)} = E \frac{1}{2b^2 K}$$



STANJE X1=X2=0:
(od „vode“)

$$Z(x) = \dots$$

$$Nj = -Z \cdot a$$

$$w = a \cdot e_j = \frac{a}{Eh} (Nj - u \cdot Nx) (Nx = 0 \text{ uglavnom})$$

$$Ed_{10} = E \cdot \left(\frac{dw}{dx} \right)_{(x=0)}$$

$$Ed_{22} = E \cdot w_{(x=0)}$$

