

## MEMBRANSKA TEORIJA CILINDRICNIH LJUSKI

-uslovi ravnoteze-

$$\left\{ \begin{array}{l} (1) \frac{dN_x}{dx} + \frac{dN_x j}{Rdj} + X = 0 \\ (2) \frac{dN_j}{Rdj} + \frac{dN_j x}{dx} + Y = 0 \\ (3) \frac{N_j}{R} + Z = 0 \end{array} \right. \left. \begin{array}{l} (1) \frac{dN_x}{dx} + \frac{dN_x j}{Rdj} + X = 0 \\ (2) \frac{dN_j}{Rdj} + \frac{dN_j x}{dx} + Y = 0 \\ (3) \frac{N_j}{R} + Z = 0 \end{array} \right\}$$

$$\left\{ \begin{array}{l} N_j = -Z \cdot R \\ N_j x = -\int \left( Y + \frac{dN_j}{Rdj} \right) dx + C1(j) \\ N_x = -\int \left( X + \frac{dN_j x}{Rdj} \right) dx + C2(j) \end{array} \right\}$$

$$z a X \equiv 0; Y, Z = f(j)$$

$$\left\{ \begin{array}{l} N_j = -Z \cdot R \\ N_j x = -\left( Y + \frac{dN_j}{Rdj} \right) \cdot x + C1(j) \\ N_x = \frac{1}{R} \frac{d}{dj} \left( Y + \frac{dN_j}{Rdj} \right) \frac{x^2}{2} - \frac{1}{R} \frac{dC1(j)}{dj} \cdot x + C2(j) \end{array} \right.$$

**-kružna cilindrična ljuska-**

**R=const=a**

-opterećenje razvijamo u red

$$X = \sum_{n=1}^{\infty} X_n \cos nj; Y = \sum_{n=1}^{\infty} Y_n \sin nj; Z = \sum_{n=1}^{\infty} Z_n \cos nj;$$

-zadržavamo samo n-te članove:

$$Nj = -Zn \cdot a$$

$$Nj x = -\sin nj \int (Yn + n \cdot Zn) \cdot dx + C1(j)$$

$$Nx = \frac{1}{a} \cos nj \int \left[ aXn - n \int (Yn + n \cdot Zn) \cdot dx \right] \cdot dx - \frac{1}{a} \frac{dC1(j)}{dj} + C2(j)$$

-specijalan slučaj-

$$zaXn \equiv 0; Yn, Zn = f(j) \Rightarrow \begin{cases} C1 = A1 \sin nj \\ C2 = A2 \cos nj \end{cases}$$

$$Nj = -Zn \cdot a$$

$$Nj x = -[(Yn + n \cdot Zn) \cdot x + A1] \cdot \sin nj$$

$$Nx = \left\{ \frac{n}{a} \left[ (Yn + n \cdot Zn) \frac{x^2}{2} - A1 \cdot x \right] + A2 \right\} \cos nj$$