MEMBRANSKA TEORIJA CILINDRICNIH LJUSKI

-uslovi ravnoteze-

$$\left\{\begin{array}{l}(1)\,\dfrac{dNx}{dx}+\dfrac{dNx\,j}{Rd\,j}+X\ =0(1)\,\dfrac{dNx}{dx}+\dfrac{dNx\,j}{Rd\,j}+X\ =0\\(2)\,\dfrac{dN\,j}{Rd\,j}+\dfrac{dN\,j\,x}{dx}+Y=0\\(3)\,\dfrac{N\,j}{R}+Z=0\end{array}\right\}\Bigg\}$$

$$\left\{\begin{array}{l}N\,j\ =-Z\cdot R\\N\,j\,x=-\int\left(Y+\dfrac{dN\,j}{Rd\,j}\right)dx+C1(j\,)\\Nx=-\int\left(X+\dfrac{dN\,j\,x}{Rd\,j}\right)dx+C2(j\,)\end{array}\right\}$$

$$zaX\equiv 0;Y,Z=f\left(j\,\right)$$

$$\left\{\begin{array}{l}N\,j\ =-Z\cdot R\\N\,j\,x=-\left(Y+\dfrac{dN\,j}{Rd\,j}\right)\cdot x+C1(j\,)\\Nx=\dfrac{1}{R}\dfrac{d}{d\,j}\left(Y+\dfrac{dN\,j}{Rd\,j}\right)\dfrac{x^2}{2}-\dfrac{1}{R}\dfrac{dC1(j\,)}{d\,j}\cdot x+C2(j\,)\end{array}\right.$$

-kruzna cilindricna ljuska-

R=const=a

-opterecenje razvijamo u red

$$X=\sum_{n=1}^{\infty}Xn\cos n\,j\,;Y=\sum_{n=1}^{\infty}Yn\sin n\,j\,;Z=\sum_{n=1}^{\infty}Zn\cos n\,j\,;$$

-zadrzavamo samo n-te clanove:

$$Nj = -Zn \cdot a$$

$$Njx = -\sin nj \int \left(Yn + n \cdot Zn\right) \cdot dx + C1(j)$$

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

-specijalan slucaj-

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

$$Nj = -Zn \cdot a$$

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

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