

## PLOCE NAPREGNUTE U SVOJOJ RAVNI

- naponska f-ja F:

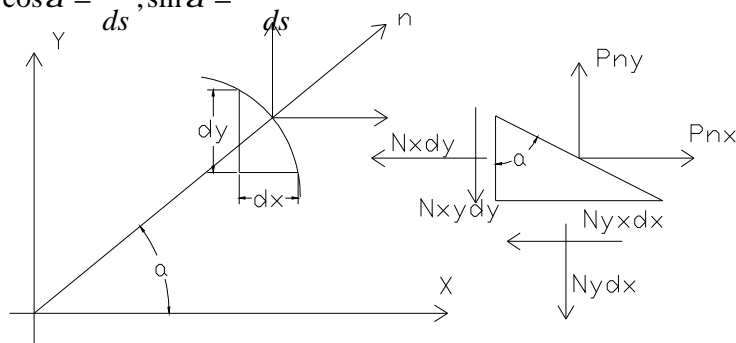
$$- N_{xy} = -\frac{d^2 F}{dx dy} ; N_x = \frac{d^2 F}{dy^2} ; N_y = \frac{d^2 F}{dx^2} ; \text{ ako su } X \text{ i } Y=0$$

DJ: za ploču opterećenu silama po konturi:

$$\frac{d^4 F}{dx^4} + 2 \cdot \frac{d^4 F}{dx^2 dy^2} + \frac{d^4 F}{dy^4} = 0 \text{ (za ploču opterećenu silama po konturi)}$$

- konturni uslovi:

$$\cos a = \frac{dy}{ds} ; \sin a = -\frac{dx}{ds}$$



$$\frac{dF}{dy} = \int_s p_{nx} ds = Q_x$$

$$\frac{dF}{dx} = -\int_s p_{ny} ds = -Q_y$$

$$dF = \frac{dF}{dx} dx + \frac{dF}{dy} dy \Rightarrow F = \int_0^s p_{ny} (x - x_s) ds + \int_0^s p_{nx} (y_s - y) ds = M$$

$$\frac{dF}{dn} = \frac{dF}{dx} \cos a + \frac{dF}{dy} (-\sin a)$$

-Naponska f-ja mora da zadovolji DJ.

-opterećenje po konturi na osnovu F(x,y):

$$p_{nx} = N_x \frac{dy}{ds} + N_{xy} \frac{dx}{ds} \Rightarrow p_{nx} = \frac{d^2 F}{dy^2} \cos a + \frac{d^2 F}{dx dy} \sin a$$

$$p_{ny} = N_y \frac{dx}{ds} + N_{xy} \frac{dy}{ds} \Rightarrow p_{ny} = -\frac{d^2 F}{dx^2} \sin a - \frac{d^2 F}{dx dy} \cos a$$

-SILE U PRESEKU:

$$N_x = D \left( \frac{du}{dx} + u \frac{dv}{dy} \right)$$

$$N_y = D \left( \frac{dv}{dy} + u \frac{du}{dx} \right)$$

$$D = \frac{Eh}{(1-u^2)}$$

$$N_x = \frac{1}{2}(1-u)D \left( \frac{du}{dy} + \frac{dv}{dx} \right)$$