Formule za višjo trdnost

$\vec{p}_i \cdot \vec{n}_j = \vec{p}_j \cdot \vec{n}_i$		
$P_{x1} = \sigma_x \cdot n_{x1} + \tau_{xy} \cdot n_{y1}$ $P_{y2} = \tau_{yx} \cdot n_{x1} + \sigma_y \cdot n_{y1}$	$P_i = \sigma_{ij} \cdot n_j$	
Glavne normalne nap. $(\sigma_x - \sigma) \cdot n_x + \tau_{xy} \cdot n_y = 0$ $\tau_{yx} \cdot n_x + (\sigma_y - \sigma) \cdot n_y = 0$	$\sigma_{1,2} = \frac{\sigma_x + \sigma_y}{2} \pm \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$	$\tau_{n,i} = \sqrt{P_i^2 - \sigma_{n,i}^2}$
$\sigma_n = \frac{\sigma_x + \sigma_y}{2} + \frac{\sigma_x - \sigma_y}{2} \cdot Cos(2\varphi) + \tau_{xy} \cdot Sin(2\varphi)$		
$\tau_n = \frac{\sigma_y - \sigma_x}{2} \cdot Sin(2\varphi) + \tau_{xy} \cdot Cos(2\varphi)$		$n_{i,x}^2 + n_{i,y}^2 + n_{i,z}^2 = 1$
$\tau_{\max} = \frac{\sigma_2 - \sigma_1}{2}$		$\sigma_x + \sigma_y = \sigma_1 + \sigma_2$
Deformacije (lega in velikost)		
$\tan\varphi = \frac{n_x}{n_y}$ $\quad \vec{n} = (n_x, n_y)$		
Hookov zakon		
$\mu = \frac{E}{2(1+\nu)} = G$	$\varepsilon_{xx} = \frac{1}{E}\left[\sigma_x - \nu(\sigma_y + \sigma_z)\right]$	$\varepsilon_{xy} = \frac{1+\nu}{E} \cdot \tau_{xy} = \frac{1}{2}\gamma_{xy}$
	$\varepsilon_{yy} = \frac{1}{E}\left[\sigma_y - \nu(\sigma_z + \sigma_x)\right]$	$\varepsilon_{yz} = \frac{1+\nu}{E} \cdot \tau_{yz} = \frac{1}{2}\gamma_{yz}$
$\varepsilon_{n,AB} = \frac{\Delta\overline{AB}}{\overline{AB}}$	$\varepsilon_{zz} = \frac{1}{E}\left[\sigma_z - \nu(\sigma_x + \sigma_y)\right]$	$\varepsilon_{zx} = \frac{1+\nu}{E} \cdot \tau_{zx} = \frac{1}{2}\gamma_{zx}$
$\varepsilon_n = \varepsilon_{xx} \cdot Cos^2(\varphi) + \varepsilon_{yy} \cdot Sin^2(\varphi) + \varepsilon_{xy} \cdot Sin(2\varphi)$		
$\frac{1}{2}\gamma_n = \frac{\varepsilon_{yy} - \varepsilon_{xx}}{2} \cdot Sin(2\varphi) + \varepsilon_{xy} \cdot Cos(2\varphi)$	$\varepsilon_{1,2} = \frac{\varepsilon_x + \varepsilon_y}{2} \pm \sqrt{\left(\frac{\varepsilon_x - \varepsilon_y}{2}\right)^2 + \varepsilon_{xy}^2}$	
$\left(\frac{1}{2}\gamma_n\right)^2 = \varepsilon^2 - \varepsilon_n^2$	$\gamma_{1,2} = \pm(\varepsilon_1 - \varepsilon_2)$	
$\vec{n}_2 = (\cos(\alpha_2), \cos(\beta_2), \cos(\gamma_2))$	$\tan(2\varphi) = \frac{2 \cdot \varepsilon_{xy}}{\varepsilon_{xx} - \varepsilon_{yy}}$	

Virtualno delo		**Airiy-eva funkcija**
$\delta W_n = \delta W_z$		RNS: $\Delta\Delta F - (1-\nu)\Delta V = 0$

$\delta W_n = \int_s \left[\frac{N \cdot \delta N}{E \cdot A} + \chi \frac{T \cdot \delta T}{G \cdot A} + \frac{M \cdot \delta M}{E \cdot I} \right] ds$	RDS: $\Delta\Delta F - \frac{(1-2\nu)}{(1-\nu)} \Delta V = 0$
$\delta W_z = \sum_i \left(\delta F_i \cdot u_i + \delta M_i \cdot \varphi_i \right)$	Če je $\Delta V = 0$ je RNS = RDS
$u_G + u_V = 0$ ali $u_G + u_V + \Delta L = 0$	
$\Delta L = \frac{N \cdot L}{E \cdot A} + \alpha \cdot \Delta T \cdot L$	$\frac{\partial^4 F}{\partial x^4} + 2 \frac{\partial^4 F}{\partial x^2 \partial y^2} + \frac{\partial^4 F}{\partial y^4} = 0$
RNS: $\sigma_z = 0$ **;** $\varepsilon_{zz} \neq 0$	$\sigma_x = \frac{\partial^2 F}{\partial y^2} - V$; $\sigma_y = \frac{\partial^2 F}{\partial x^2} - V$; $\tau_{xy} = -\frac{\partial^2 F}{\partial x \partial y}$
$\sigma_r = A + B \cdot r^{-2} - \frac{3+\nu}{8} \cdot \rho \cdot \omega^2 \cdot r^2$	**Krožne stene v el. plastičnem področju:**
$\sigma_\varphi = A - B \cdot r^{-2} - \frac{1+3\nu}{8} \cdot \rho \cdot \omega^2 \cdot r^2$	RNS: $\sigma_r \neq 0$, $\sigma_\varphi \neq 0$, $\sigma_z = 0$, $\tau_{r\varphi} = 0$
$u_r = \frac{r}{E} \left[(1-\nu) \cdot A - (1+\nu) \cdot B \cdot r^{-2} - \frac{1-\nu^2}{8} \cdot \rho \cdot \omega^2 \cdot r^2 \right] + \alpha \cdot \Delta T \cdot r$	TRESCA
$\varepsilon_{zz} = \frac{\partial u_z}{\partial z}$ $\qquad u_z = \frac{\nu \cdot z}{E} \left[\frac{1+\nu}{2} \cdot \rho \cdot \omega^2 \cdot r^2 - 2A \right] + \alpha \cdot \Delta T \cdot r$	$\left[(\sigma_r - \sigma_\varphi)^2 - \sigma_0 \right] \cdot \left[\sigma_\varphi^2 - \sigma_0^2 \right] \cdot \left[\sigma_r^2 - \sigma_0^2 \right] = 0$
RDS: $\sigma_z \neq 0$ **;** $\varepsilon_{zz} = 0$	1) $\sigma_r - \sigma_\varphi = \pm\sigma_0$; $\sigma_r^{pl} = \pm\sigma_0 \cdot \ln(C/r)$; $\sigma_\varphi^{pl} = \pm\sigma_0 \cdot (\ln(C/r) + 1)$ $u_r^{pl} = \pm\frac{(1-\nu)}{E} \cdot \sigma_0 \cdot r \cdot \ln(C/r) + \frac{D}{r} + \alpha \cdot \Delta T \cdot r$
$\sigma_r = A + B \cdot r^{-2} - \frac{3-2\nu}{8(1-\nu)} \cdot \rho \cdot \omega^2 \cdot r^2$	2) $\sigma_\varphi = \pm\sigma_0$; $\sigma_r^{pl} = \pm\sigma_0 + C/r$ $u_r^{pl} = \pm\frac{(1-\nu)}{E} \cdot (\pm\sigma_0 \cdot r + C) + \frac{D}{r} + \alpha \cdot \Delta T \cdot r$
$\sigma_\varphi = A + B \cdot r^{-2} - \frac{1+2\nu}{8(1-\nu)} \cdot \rho \cdot \omega^2 \cdot r^2$	3) $\sigma_r = \pm\sigma_0$; $\sigma_r^{pl} = \pm\sigma_0 = \sigma_\varphi$; $u_r^{pl} = \pm\frac{(1-\nu) \cdot r \cdot \sigma_0}{E} + \frac{D}{r} + \alpha \cdot \Delta T \cdot r$
$\sigma_z = 2 \cdot \nu \cdot A - \frac{\nu}{2(1-\nu)} \cdot \rho \cdot \omega^2 \cdot r^2 - \alpha \cdot \Delta T \cdot E$	
$u_r = \frac{(1+\nu) r}{E} \left[(1-2\nu) \cdot A - B \cdot r^{-2} - \frac{1-2\nu}{8(1-\nu)} \cdot \rho \cdot \omega^2 \cdot r^2 \right] + (1+\nu) \alpha \cdot \Delta T \cdot r$	