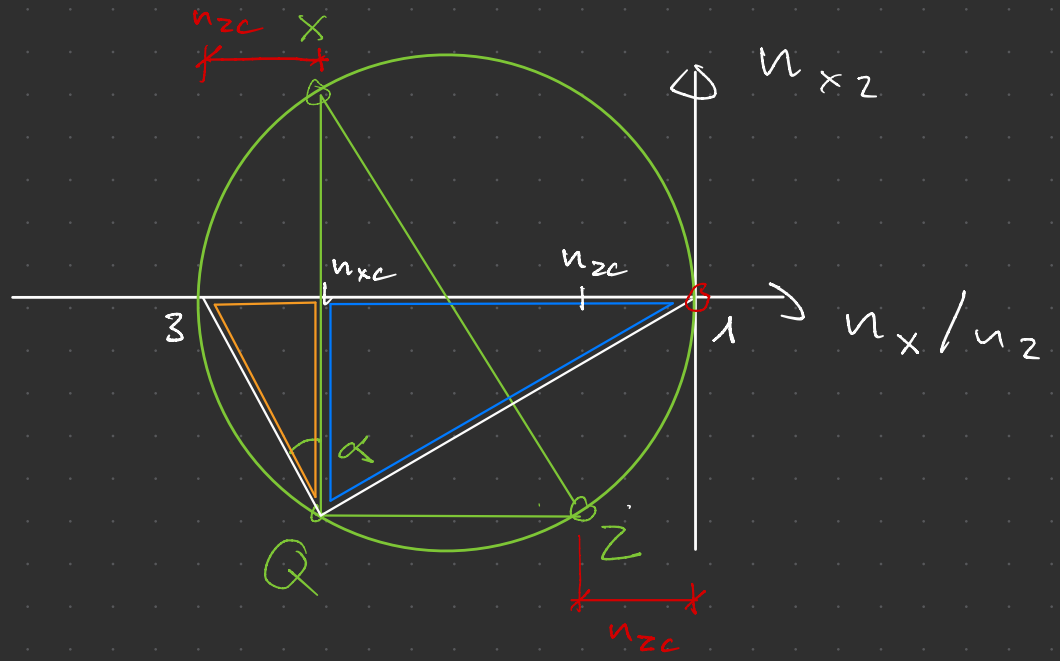
Alternative deduction of Yield Regime 1 containing stress field inclination



$$\tan\alpha = \frac{n_{zc}}{n_{xzc}}$$

$$\tan\alpha = \frac{n_{xzc}}{n_{xc}}$$

$$\Rightarrow \tan^2\alpha = \frac{n_{zc}}{n_{xc}}$$

$$\Rightarrow \cot^2\alpha = \frac{n_{xc}}{n_{zc}} = \frac{a_{sx} f_{sd} - n_x}{a_{sz} f_{sd} - n_z}$$

Decoupling of equation of Yield Regime 1

hs/16.11.2023

$$Y_1 : \cot^2 \alpha = (a_{sx} f_{sx} - n_x)/(a_{sz} f_{sz} - n_z)$$

$$\longrightarrow \quad (a_{sz} f_{sd} - n_z) \cdot \cot^2 \alpha = (a_{sx} f_{sd} - n_x)$$

$$Y_1 = n_{xz}^2 - (a_{sx} f_{sx} - n_x)(a_{sz} f_{sz} - n_z) = 0$$

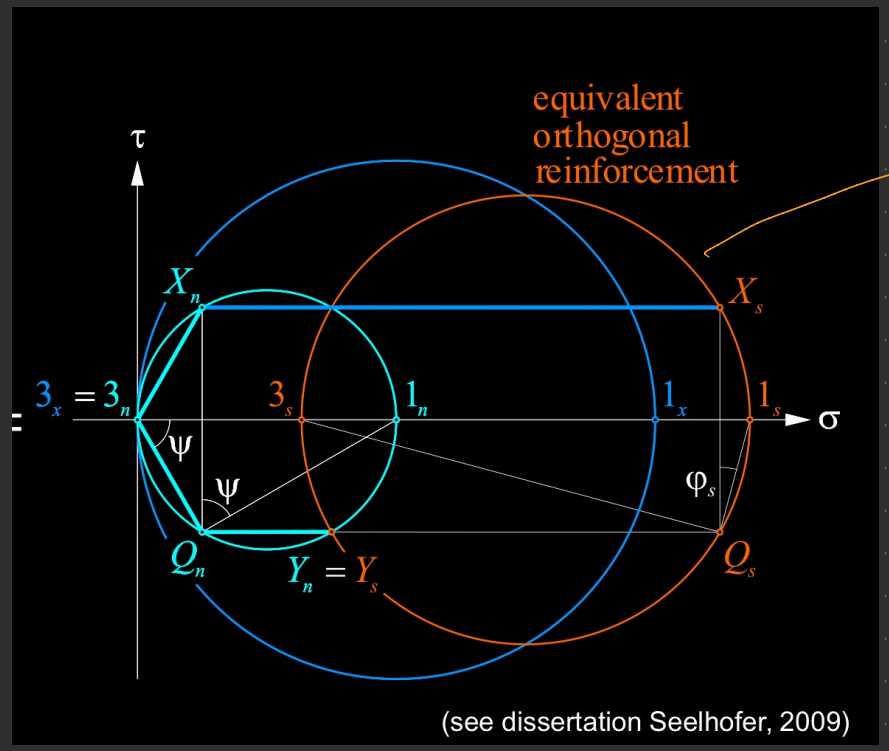
$$\Longrightarrow \quad n_{xz}{}^2 - \cot^2 \alpha \, (a_{sz} f_{sd} - n_z)^2 = 0$$

$$\hookrightarrow \quad a_{sz} f_{sd} - n_z = \frac{|n_{xz}|}{\cot \alpha}$$

$$\hookrightarrow \quad a_{sx} f_{sd} - n_x = |n_{xz}| \cdot \cot \alpha$$

Transformation of stresses of skew reinforcement and loads in order to use Y1-Yield Conditions

hs/16.11.2023



(see dissertation Seelhofer, 2009)