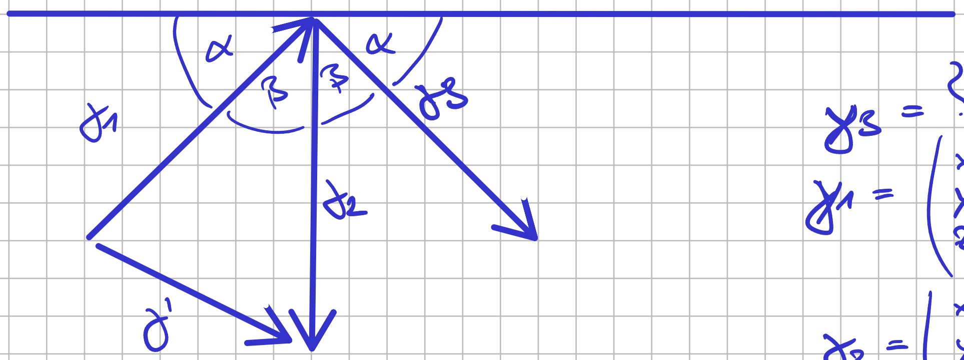
Winkel Berechnung:



$\gamma_3 = ?$

$\gamma_1 = \begin{pmatrix} x_1 \\ y_1 \\ z_1 \end{pmatrix}$

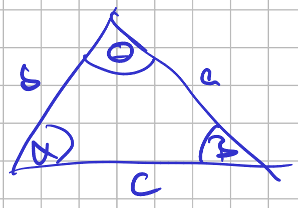
$\gamma_2 = \begin{pmatrix} x_2 \\ y_2 \\ z_2 \end{pmatrix}$

$\alpha, \beta = ?$

$\alpha + \beta = 90°$

$\gamma' = \gamma_1 + \gamma_2$

$a = |\gamma_1| \quad b = |\gamma_2| \quad c = |\gamma'|$



$$c^2 = a^2 + b^2 - 2ab \cdot \cos \Theta$$

$$\Leftrightarrow \cos \Theta = \frac{a^2 + b^2 - c^2}{2ab} \Leftrightarrow \Theta = \cos^{-1}\left(\frac{a^2 + b^2 - c^2}{2ab}\right)$$

$$\underline{\underline{\cos^{-1}\left(\frac{|\gamma_1|^2 + |\gamma_2|^2 - |\gamma'|^2}{2 \cdot |\gamma_1| \cdot |\gamma_2|}\right) = \beta}}$$