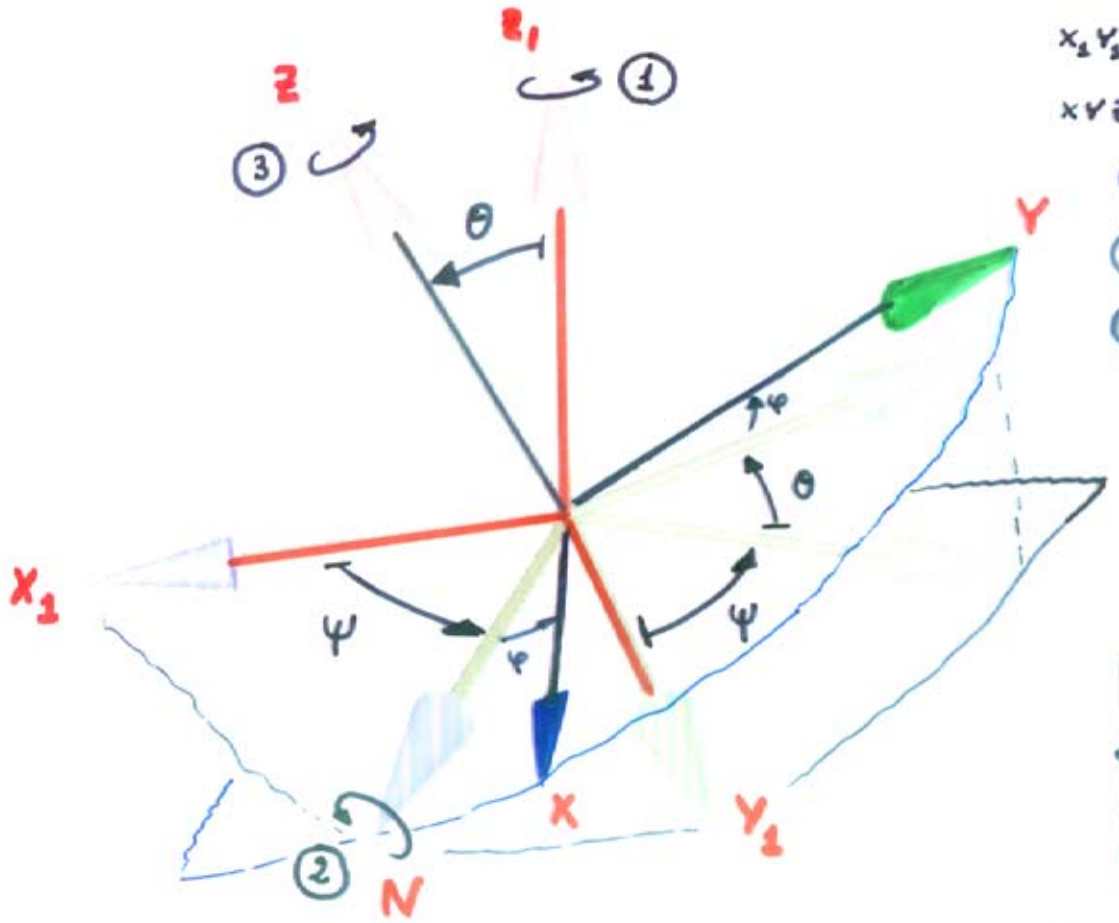
2. Euler-en angeluak.



$x_1 y_1 z_1$ sistema finkoa

xyz mugikorra

① Ψ ang. biratu z_1 ardatza. Prezesio-angelua.

② θ ang. biratu N ardatza. Nutazio-ang.

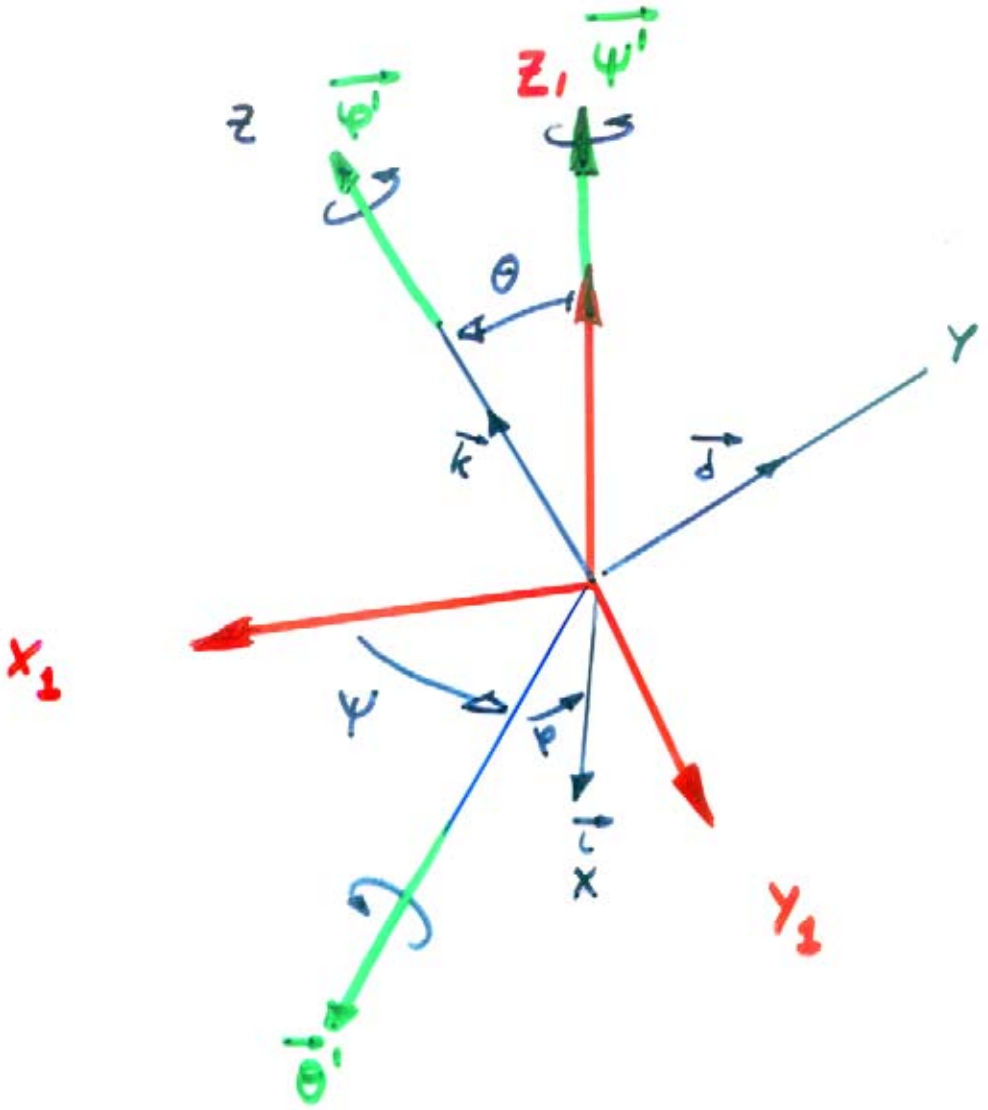
③ φ ang. biratu z ardatza. Berezko biraketa ang.

$$\vec{\omega} = \vec{\varphi}' + \vec{\psi}' + \vec{\theta}'$$

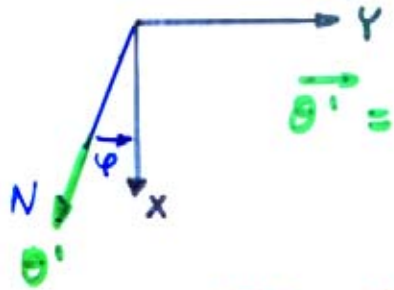
xyz sisteman idatzia

$$\begin{cases} \vec{\varphi}' = \varphi' \vec{k} \\ \vec{\theta}' = \theta' (\cos\varphi\, \vec{\imath} - \sin\varphi\, \vec{\jmath}) \\ \vec{\psi}' = \psi' \left[\sin\theta (\sin\varphi\, \vec{\imath} + \cos\varphi\, \vec{\jmath}) + \cos\theta\, \vec{k} \right] \end{cases}$$

$$\begin{cases} \omega_x = \psi' \sin\theta \sin\varphi + \theta' \cos\varphi \\ \omega_y = \psi' \sin\theta \cos\varphi - \theta' \sin\varphi \\ \omega_z = \varphi' + \psi' \cos\theta \end{cases}$$



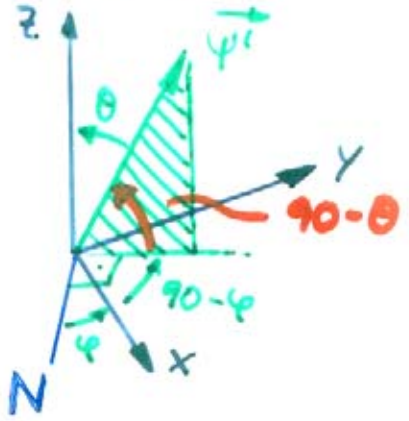
- $\vec{\varphi'} = \varphi' \vec{k}$
- $\vec{\theta'} \in XOY$



$$\vec{\theta'} = \theta' (\cos\varphi \, \vec{i} - \sin\varphi \, \vec{j})$$

- $\vec{\psi'}$ / $\vec{\psi'} \perp \vec{\theta'}$

$\text{ang}(\vec{\psi'}, \vec{\varphi'}) = \theta$



$$\vec{\psi'} = \psi' \cos\theta \, \vec{k} + \psi' \sin\theta \, \vec{i}$$

$$\vec{\psi'} = \psi' \sin\theta (\sin\varphi \, \vec{i} + \cos\varphi \, \vec{j}) + \psi' \cos\theta \, \vec{k}$$