Euler Params: Expressing
$\vec{h}$ as a function of $\vec{u}$, χ, and $\vec{k}$

$\boxed{01/1}$

$\|PN\| = \|NW\|$

$\frac{\pi}{2}$ Angles: $\widehat{ONP}$, $\widehat{NRW}$

W, P, R, N - belong to the same plane (plane of rotation)

$\vec{c} = \vec{u}\cdot(\vec{k}\cdot\vec{u})$ → obvious since $\vec{k}$ & $\vec{u}$ are unit vectors.

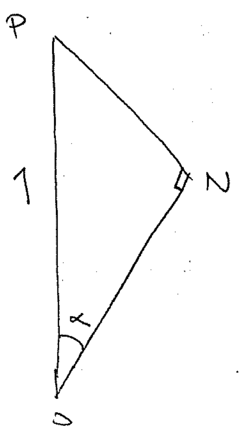
$\vec{a} = \vec{u}\times\vec{k}\cdot\sin\chi$.

First note that $\vec{a} \parallel \vec{u}\times\vec{k}$ ⇒ there is a coeff. "d" s.t.

$$\vec{a} = d\cdot\vec{u}\times\vec{k}.$$

$d = ?$

Note that $\|\vec{u}\times\vec{k}\| = 1\cdot 1\cdot\sin\alpha = \|PN\| = \|WN\|$



But $\|a\| = \|WN\|\cdot\sin\chi = \|\vec{u}\times\vec{k}\|\cdot\sin\chi$

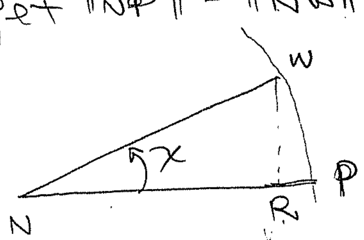
⇓

$$\boxed{\vec{a} = \vec{u}\times\vec{k}\ \sin\chi}$$

Next: $\vec{b} = [\vec{k} - (\vec{u}\cdot\vec{k})]\cos\chi$

Note that $\vec{k} - \vec{u}\,\vec{k} = \vec{NP}$

yet $\|\vec{NP}\| = \|\vec{NW}\|$



$$\vec{b} = \vec{NR} = \frac{\vec{NP}}{\|NP\|}\cdot\|NR\| = \frac{\vec{NP}}{\cancel{\|NP\|}}\cdot\cancel{\|NW\|}\cdot\cos\chi$$

$$= \vec{NP}\cdot\cos\chi = [\vec{k} - (\vec{u}\cdot\vec{k})]\cos\chi$$