Euler's Thm

Aside

$\vec{r}' = [A]\vec{r}$

↑ CTM

$[A]^T[A] = [I]$ shown labriously earlier

$\det[I] = 1 = \det(A^TA) = \det(A^T)\det(A) = (\det A)^2$

$\Rightarrow \det A = \pm 1 \rightarrow +1$ is our Right Handed x formation.

$\det(A - I) =$ ~~$\det((A - I)^T) = \det(A^T - I) =$~~

$\det A^T \det(A - I) = \det(A^T(A - I)) =$

$\det A^T$ = 1

$\det(I - A^T) = \det(A^T - I) = -\det((A - I)^T) = -\det(A - I) = \phi$

$\Rightarrow \lambda = 1$ is a root of $\det(A - \lambda I)$ (eigen value of A)

~~$[A]\vec{r} = \vec{r}$~~ $\exists$ a non zero vector $\hat{n}$ ∋

$(A - I)\hat{n} = \hat{\phi} \Rightarrow A\hat{n} = \hat{n}$

$\hat{n}$ is invariant under transformation ⇒ it's the axis of rotation

$\Rightarrow \hat{n}$ is eigen-vector corresponding to $\lambda = 1$.

~~$A\vec{r} = \vec{r}$~~ $\vec{\Omega} = |\vec{\Omega}|\hat{n}$