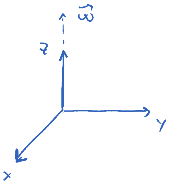
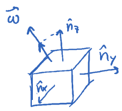
Pavel's stuff

Monday, October 28, 2019 9:53 AM

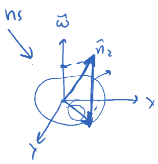


$\left.\begin{array}{l}\hat{n}_s \\ \vec{\omega} \\ \hat{n}_z \\ \hat{n}_x\end{array}\right\}$ define initially

$n_z = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, \; n_x = \begin{bmatrix} \cos\theta \\ \sin\theta \\ 0 \end{bmatrix}$ θ : arbitrary



$\hat{e}_z = \frac{\vec{\omega}}{\|\vec{\omega}\|}$



dot product, norm

$$\hat{n}_z = \begin{bmatrix} \|\hat{n}_z - (\hat{n}_z \cdot \hat{e}_z)\hat{e}_z\| \cos(\omega t) \\ \|\hat{n}_z - (\hat{n}_z \cdot \hat{e}_z)\hat{e}_z\| \sin(\omega t) \\ (\hat{n}_z \cdot \hat{e}_z) \end{bmatrix}$$

$$\hat{n}_x = \begin{bmatrix} \|\hat{n}_x - (\hat{n}_x \cdot \hat{e}_z)\hat{e}_z\| \cos(\omega t + \phi_0) \\ \|\hat{n}_x - (\hat{n}_x \cdot \hat{e}_z)\hat{e}_z\| \sin(\omega t + \phi_0) \\ (\hat{n}_x \cdot \hat{e}_z) \end{bmatrix} \xrightarrow{t=0 \text{ to calculate } \phi_0}$$

$$\phi_0 = \operatorname{atan2}\left(\frac{n_{xJ}}{\|\hat{n}_x - (\hat{n}_x \cdot \hat{e}_z)\hat{e}_z\|}, \frac{n_{xI}}{\|\hat{n}_x - (\hat{n}_x \cdot \hat{e}_z)\hat{e}_z\|} \right)$$

$$\hat{n}_x = \begin{bmatrix} n_{xI} \\ n_{xJ} \\ n_{xK} \end{bmatrix}$$

$$\hat{n}_y = \hat{n}_z \times \hat{n}_x$$

$$\Downarrow$$

$-\hat{n}_x$ $\hat{n}_x(t)$

$-\hat{n}_y$ $\hat{n}_y(t)$

$-\hat{n}_z$ $\hat{n}_z(t)$

$\rightarrow$

$\varphi_x = \hat{n}_s \cdot \hat{n}_x$

$\varphi_y = \hat{n}_s \cdot \hat{n}_y$

$\varphi_z = \hat{n}_s \cdot \hat{n}_z$

$\varphi_{-x} = -\hat{n}_x \cdot \hat{n}_s$

$\varphi_{-y} = -\hat{n}_y \cdot \hat{n}_s$

$\varphi_{-z} = -\hat{n}_z \cdot \hat{n}_s$