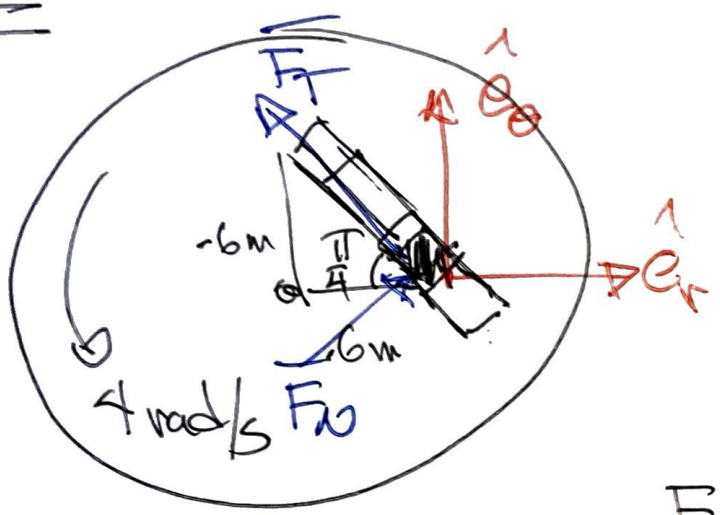
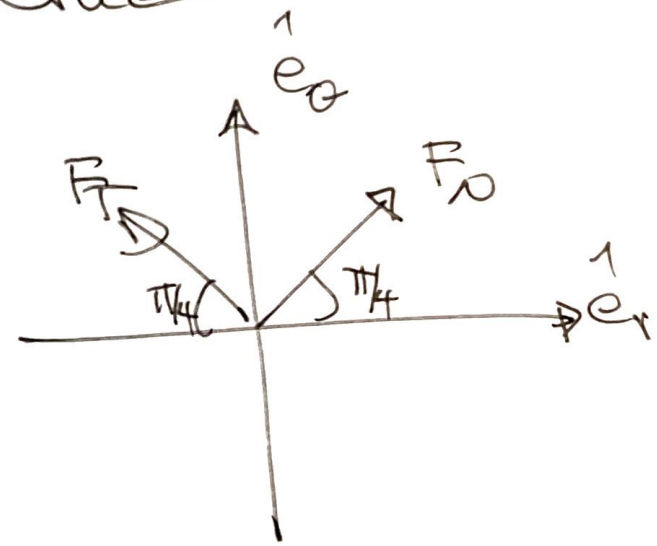
Sample Prob 6-2 ENGR212 Bruce

In Polar:





$$F_\theta = F_T \sin\tfrac{\pi}{4} + F_N \sin\tfrac{\pi}{4} = m a_\theta$$

$$F_r = F_N \cos\tfrac{\pi}{4} - F_T \cos\tfrac{\pi}{4} = m a_r$$

Polar

$$a_r = \underbrace{\frac{d^2 r}{dt^2}}_{\to 0} - r\omega^2$$

$$a_\theta = \underbrace{r\alpha}_{\to 0} + 2\underbrace{\frac{dr}{dt}}_{\to 0}\omega$$

$\Leftarrow$ { $\omega = \text{const} \Rightarrow \alpha = 0$; $r = \text{const} \Rightarrow \frac{dr}{dt} = 0 = \frac{d^2 r}{dt^2}$

$\Rightarrow a_\theta = 0,\ a_r = -r\omega^2$ $\leftarrow$ except for the (−) sign this is just where we got to in n/t coord!