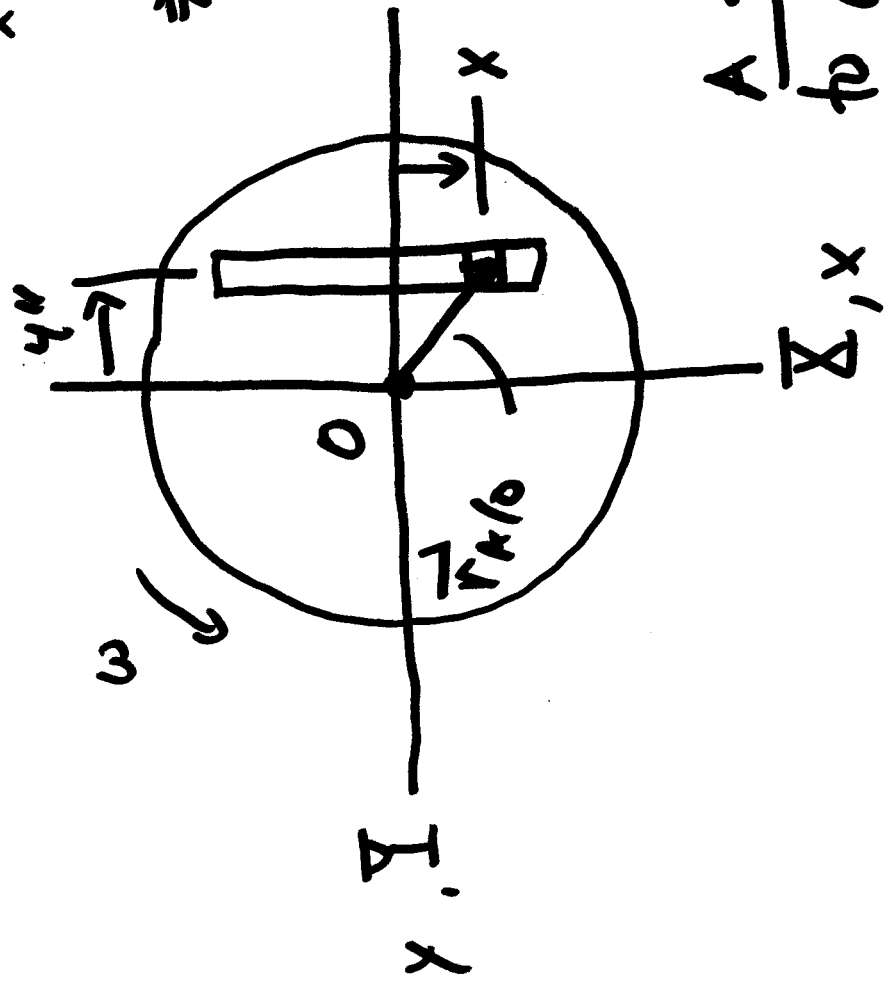


Σ Fixed frame

x, y rotates with the part

\Rightarrow Rotates with angular

velocity $\vec{\omega} = -\omega \vec{k}$



Since motion of

A specified relative

to 0 rotating part

\Rightarrow Use rotating frames



$$\vec{V}_A = \vec{V}_O + \vec{\omega} \times \vec{r}_{A/O} + (\vec{V}_{A/O})_{xyz}$$

$$\vec{a}_A = \vec{a}_O + \dot{\vec{\omega}} \times \vec{r}_{A/O} + \vec{\omega} \times \dot{\vec{r}}_{A/O} + \vec{\omega} \times \vec{\omega} \times \vec{r}_{A/O} + 2\vec{\omega} \times (\vec{V}_{A/O})_{xyz} + (\vec{a}_{A/O})_{xyz}$$

$$\vec{a}_O = 0\vec{i} + 0\vec{j}, \quad \vec{V}_O = 0\vec{i} + 0\vec{j}, \quad \vec{\omega} = -5\vec{k}$$

$$(\vec{V}_{A/O})_{xyz} = 6\vec{i} + 0\vec{j}, \quad \dot{\vec{\omega}} = 10\vec{k} \text{ rad/sec}^2$$

$$\vec{r}_{A/O} = 4\vec{i} - 4\vec{j}, \quad (\vec{a}_{A/O})_{xyz} = -20\vec{i}$$