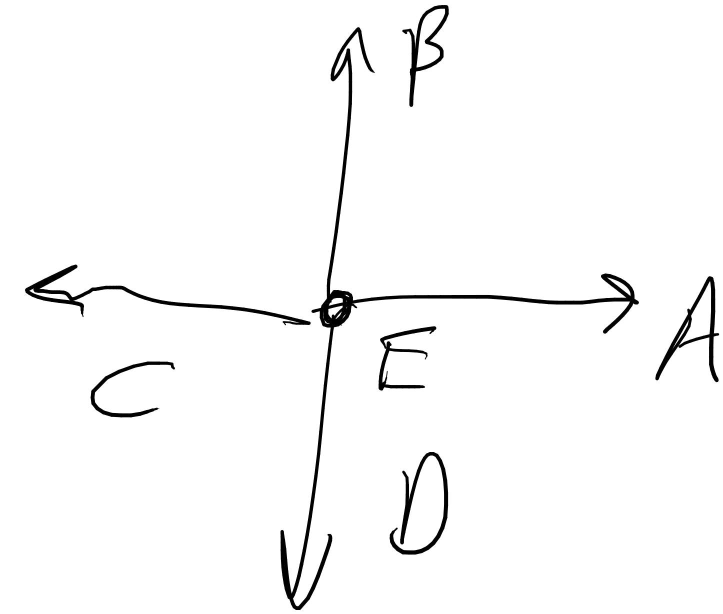
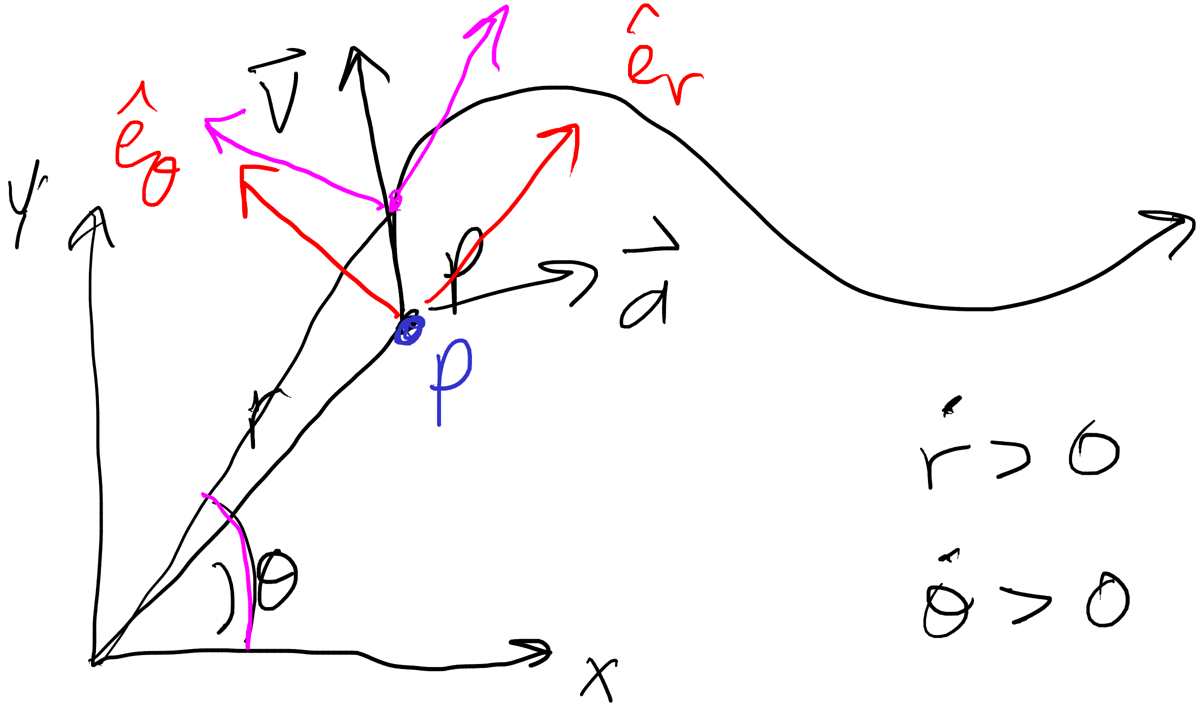
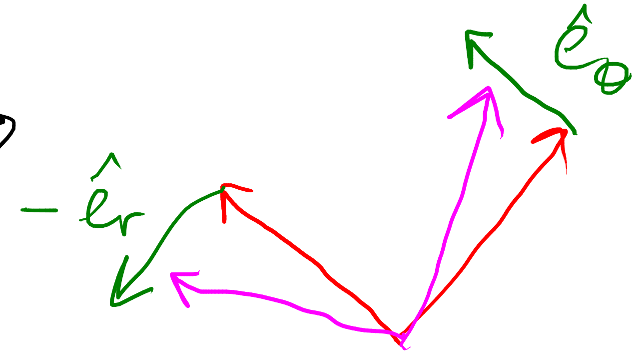

B
A
C
E
D





$\dot{r} > 0$

$\dot{\theta} > 0$

$$\vec{r} = r\cos\theta\,\hat{i} + r\sin\theta\,\hat{j}$$

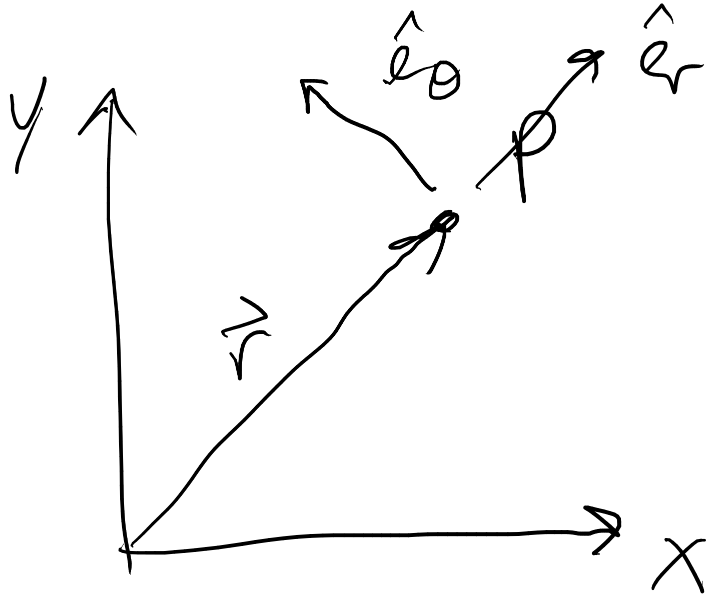
$$x = r\cos\theta$$

$$y = r\sin\theta$$

$$\hat{e}_r = \cos\theta\,\hat{i} + \sin\theta\,\hat{j}$$

$$\hat{e}_\theta = -\sin\theta\,\hat{i} + \cos\theta\,\hat{j}$$

$$\boxed{\dot{\hat{e}}_r = \dot{\theta}\,\hat{e}_\theta \qquad \dot{\hat{e}}_\theta = -\dot{\theta}\,\hat{e}_r}$$

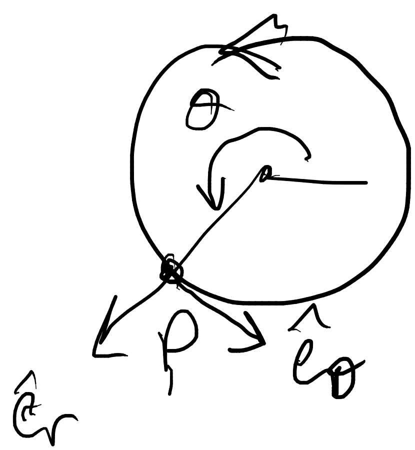


$$\vec{r} = r\hat{e}_r + \cancel{\theta \hat{e}_\theta}$$

$$\vec{v} = \dot{\vec{r}} = \dot{r}\hat{e}_r + r\dot{\hat{e}}_r$$

$$\boxed{\vec{v} = \dot{r}\hat{e}_r + r\dot{\theta}\hat{e}_\theta}$$

$r = \text{constant}$



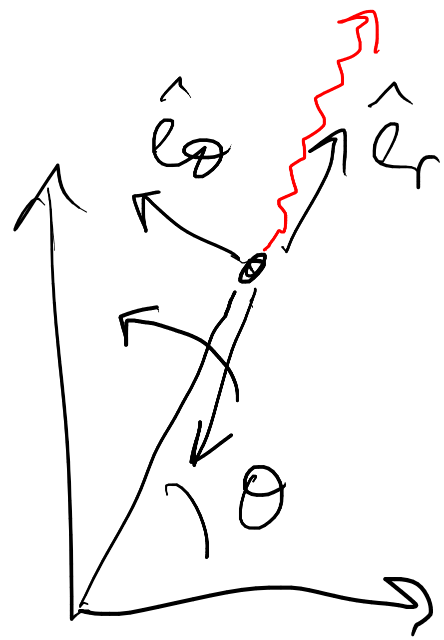
$$\vec{v} = r\dot{\theta}\hat{e}_\theta \qquad \dot{\theta} = \omega$$

$$= r\omega \underline{\underline{\hat{e}_\theta}}$$

$$v = \text{speed} = \omega r = \underline{\underline{r\omega}}$$

$$\vec{v} = \dot{r}\,\hat{e}_r + r\dot{\theta}\,\hat{e}_\theta$$

$$\vec{a} = \dot{\vec{v}} = \left(\ddot{r} - r\dot{\theta}^2\right)\hat{e}_r + \left(r\ddot{\theta} + 2\dot{r}\dot{\theta}\right)\hat{e}_\theta$$



Coriolis

Centripetal = Center-seeking

centrifugal = center-fleeing