positions → coordinates (r, θ) P

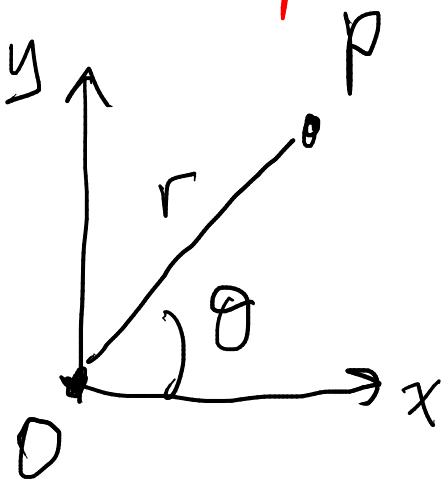
$\sqrt{3}$ 60°

vectors → components (basis)

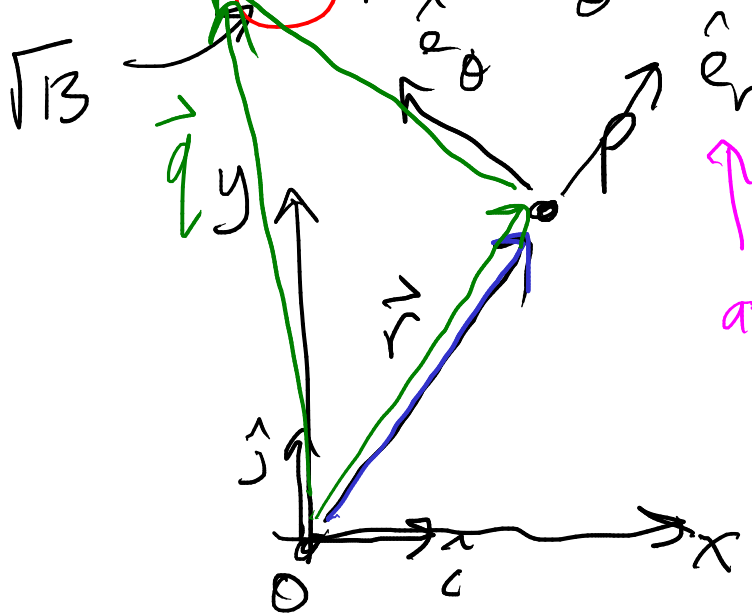
$\vec{r} = 2\hat{i} + 3\hat{j}$

$\hat{e}_r, \hat{e}_\theta$ Components

$= r\hat{e}_r + \theta\hat{e}_\theta$ $\hat{i}$ Components



position



vector

at angle θ

$\hat{e}_r = \theta\,\hat{e}_\theta$

$\vec{q} = \sqrt{3}\hat{e}_r + 2\hat{e}_\theta$

$$\vec{r} = r\,\hat{e}_r$$

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

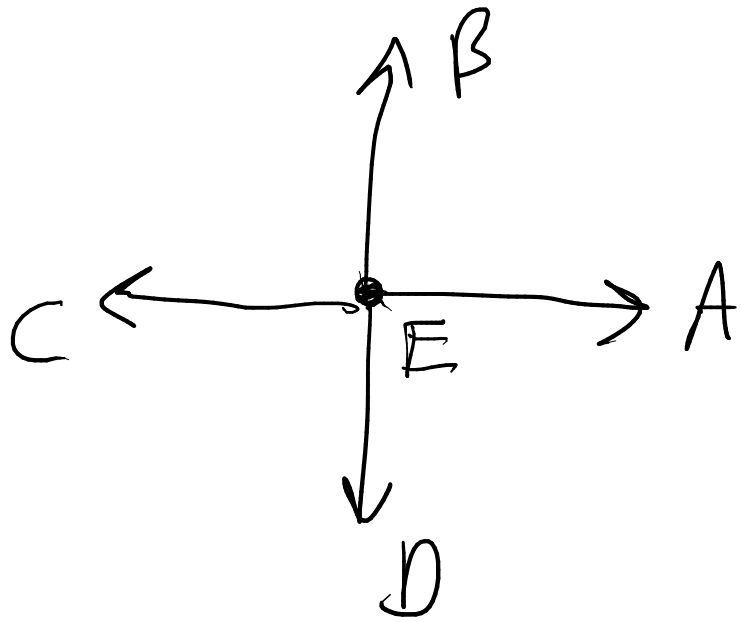
position vector $\vec{r}$

velocity $\vec{v} = \dot{\vec{r}}$

acceleration $\vec{a} = \dot{\vec{v}} = \ddot{\vec{r}}$

} position P

$\vec{r} = \overrightarrow{OP}$



$$\vec{v} = \bigcirc \hat{e}_r + \bigcirc \hat{e}_\theta$$

$$= \bigcirc \hat{i} + \bigcirc \hat{j}$$