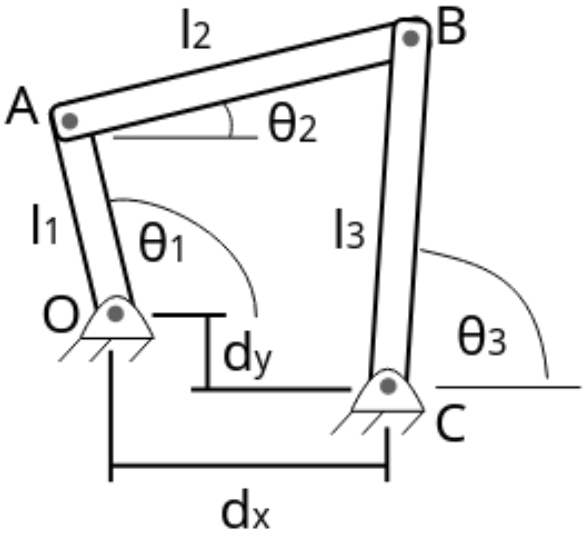
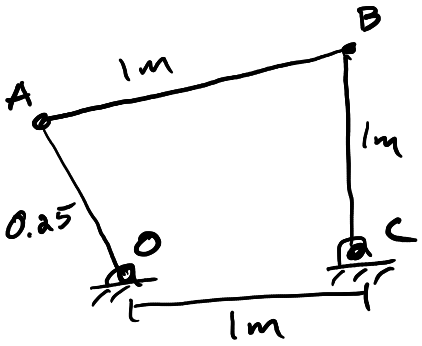




piston-crank

$\bar{r}_O = 0\hat{i} + 0\hat{j}$

$\bar{r}_A = -0.2\hat{i} + 0.15\hat{j}$

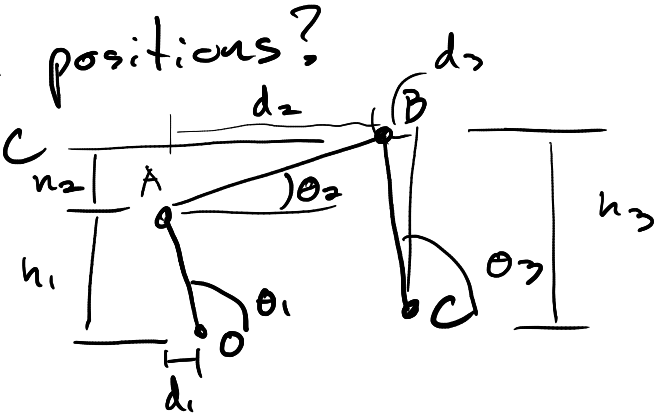
$\bar{r}_B = 0.5\hat{i} + 0.86\hat{j}$

$\bar{r}_C = 1\hat{i} + 0\hat{j}$

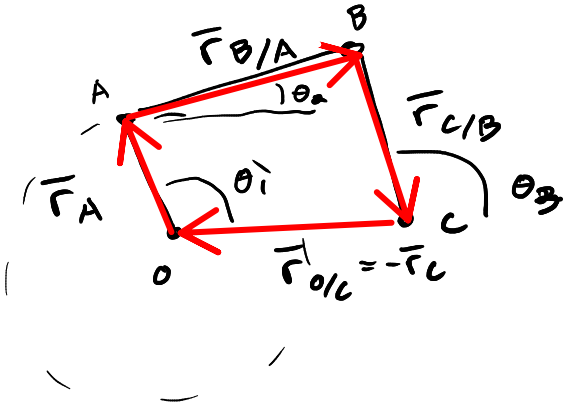
$\dot{\theta}_1 = 10 \frac{rad}{s}$

constraint on positions?

A, B, C



$h_1 + h_2 = h_3$



$\bar{r}_A = L_1(\cos\theta_1\hat{i} + \sin\theta_1\hat{j})$

$\bar{r}_{B/A} = L_2(\cos\theta_2\hat{i} + \sin\theta_2\hat{j})$

$\bar{r}_{C/B} = L_3(-\cos\theta_3\hat{i} - \sin\theta_3\hat{j})$

$-\bar{r}_C = \bar{r}_{O/C} = -d_x\hat{i}$

$$\bar{r}_A + \bar{r}_{B/A} + \bar{r}_{C/B} + \bar{r}_{O/C} = 0\hat{i} + 0\hat{j}$$ ← position constraint

$\hat{i} \rightarrow$ $L_1 \cos\theta_1 + L_2 \cos\theta_2 - L_3 \cos\theta_3 - d_x = 0$

$\hat{j} \rightarrow$ $L_1 \sin\theta_1 + L_2 \sin\theta_3 - L_3 \sin\theta_3 = 0$

$\bar{V}_A$, $\bar{V}_{B/A}$, $\bar{V}_{C/B}$, $\bar{V}_{O/C}$
? ? ? ?

Quick refresh

$\bar{r}_A \equiv$ position of A

$\bar{V}_A \equiv$ velocity of A $= \frac{d\bar{r}_A}{dt}$

$$\frac{d}{dt}\left[\bar{r}_A + \bar{r}_{B/A} + \bar{r}_{C/B} + \bar{r}_{O/C} = \bar{0}\right]$$

$$\bar{V}_A + \bar{V}_{B/A} + \bar{V}_{C/B} = \bar{0}$$