

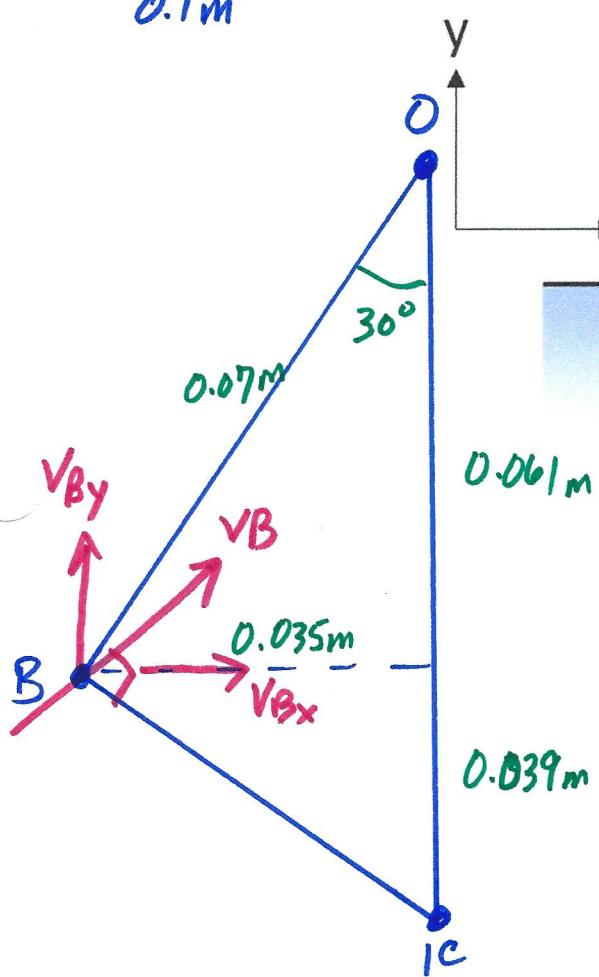
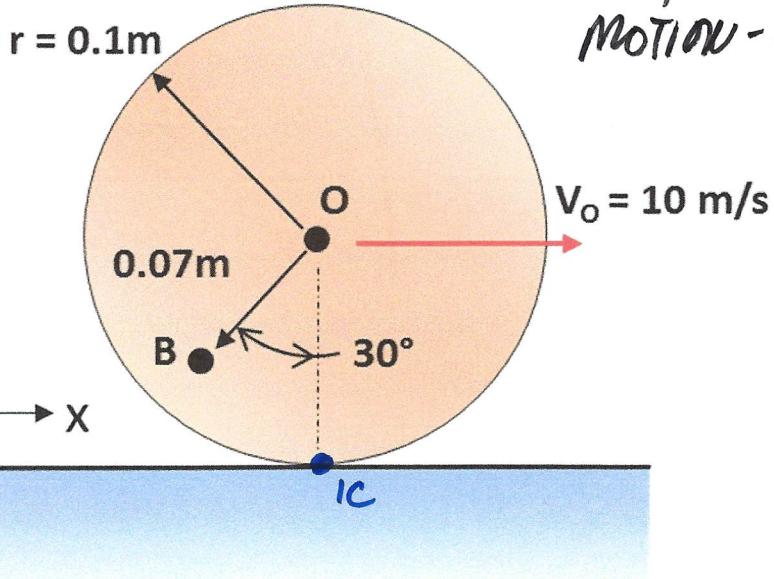
Rigid Body Kinematics IV – Problem 2

Using the diagram of a no-slip wheel below determine the components and magnitude of the velocity of point B with respect to the ground using the instant center of zero velocity (ICZV) method.

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MOTION - GPM

$$V = \omega r$$

$$\omega = \frac{10 \text{ m/s}}{0.1 \text{ m}} = 100 \text{ rad/s} \downarrow$$



$$V = \omega r$$

$$V_{Bx} = 100 (0.039) = 3.9 \text{ m/s} \rightarrow$$

$$V_{By} = 100 (.035) = 3.5 \text{ m/s} \uparrow$$

$$\overrightarrow{V}_B = [3.9, 3.5, 0] \text{ m/s}$$

$$|\overrightarrow{V}_B| = 5.24 \text{ m/s}$$

OR

$$\begin{aligned} \overrightarrow{V}_B &= \vec{\omega} \times \vec{r} [0 \ 0 \ -100] \times [-0.035 \ 0.039 \ 0] \\ &= [3.9 \ 3.5 \ 0] \text{ m/s} \end{aligned}$$