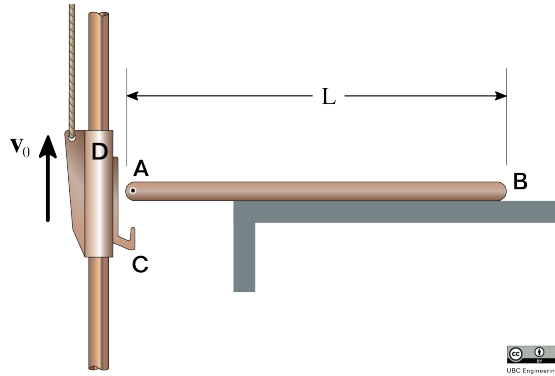# 22-R-KM-TW-1

The slider D is moving upward at a constant velocity of $\vec{v}_0 = 4$ m/s and hooks onto a rod of length $L = 6$ m. Find the angular velocity of the rod AB at the moment the slider hooks onto the rod and the rod begins to rotate. (Don't consider any displacement and assume the impact between the hook and the rod does not change the velocity of the slider.)

Solution:

$$\vec{v} = \vec{\omega} \times \vec{r}$$

$$\vec{v}_0 \perp \vec{r}_{A/B} \Rightarrow v_0 = \omega r_{A/B} = \omega L$$

$$\omega = \frac{v_0}{L}$$

Rotation is clockwise $\therefore \ \mathrm{dir}(\vec{\omega}) = -\hat{k}$

$$\Rightarrow \vec{\omega} = -\frac{v_0}{L} = -\frac{4}{6} = -0.67 \ \mathrm{rad/s}$$