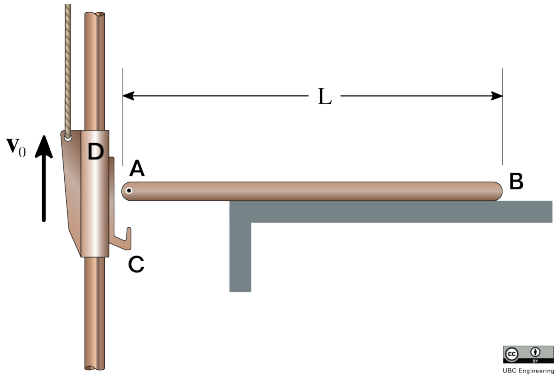
22-R-KM-TW-1



The slider D is moving upward at a constant velocity of $\vec{v}_0 = 4$ m/s and hooks onto a rod of length 6 m. Find the angular velocity of the rod AB at the moment the slider hooks onto the rod. (Neglect the mass of the rod in your calculations.)

Solution:

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

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

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

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

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