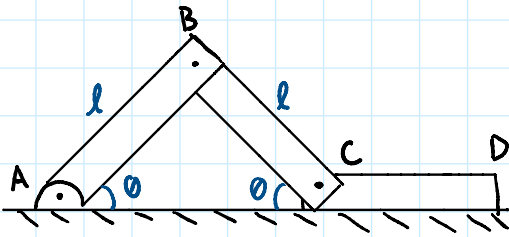


Determine the angular velocities and angular accelerations of links AB and BC if end D has a velocity of $v = 3 \text{ m/s}$ to the right and an acceleration of $a = 1 \text{ m/s}^2$ to the left. Link AB and BC both have a length $l = 0.5 \text{ m}$ and the angle is given as $\theta = 60 \text{ degrees}$.



$$S = 2(0.5) \cos \theta = \cos \theta$$

$$\dot{S} = -\sin \theta \cdot \dot{\theta}$$

$$3 = -\sin 60 (\omega)$$

$$\omega = 2\sqrt{3}$$

$$\boxed{\omega_{AB} = -2\sqrt{3} \hat{k} \quad \omega_{BC} = 2\sqrt{3} \hat{k} \text{ rad/s}}$$

$$\ddot{S} = -\cos \theta \cdot \dot{\theta}^2 - \sin \theta (\ddot{\theta})$$

$$-1 = -\cos 60 \cdot (2\sqrt{3})^2 - \sin 60 (\ddot{\theta})$$

$$\ddot{\theta} = \frac{10\sqrt{3}}{3}$$

$$\boxed{\alpha_{AB} = \frac{-10\sqrt{3}}{2} \hat{k} \quad \alpha_{BC} = \frac{10\sqrt{3}}{3} \hat{k} \text{ rad/s}^2}$$

