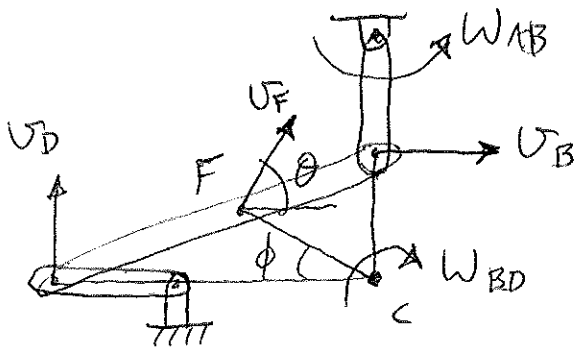


PROB. 15-83

$$v_D = 2.4 \frac{m}{s}$$

a) FIND ω_{AB}



$$v_D = \sqrt{CD} \omega_{CD}$$

$$\omega_{BD} = \frac{v_D}{\sqrt{CD}}$$

$$\omega_{BD} = \frac{(2.4 \frac{m}{s})}{(0.6 m)} = 4 \frac{RAD}{s}$$

$$v_B = \sqrt{CB} \omega_{BD} = (0.25 m) \left(4 \frac{RAD}{s} \right) = 1.0 \frac{m}{s}$$

$$v_B = \sqrt{AB} \omega_{AB} \Rightarrow \omega_{AB} = \frac{v_B}{\sqrt{AB}} = \frac{(1.0 \frac{m}{s})}{(0.2 m)} = 5.0 \frac{RAD}{s} \uparrow$$

b) FIND VELOCITY OF MIDPOINT OF BD

$$v_F = \sqrt{CF} \omega_{BD}$$

$$\sqrt{CF} = \sqrt{0.3^2 + 0.125^2} = 0.325 m$$

$$v_F = (0.325 m) \left(4 \frac{RAD}{s} \right) = 1.3 \frac{m}{s} \quad \angle 67.38^\circ$$

$$\phi = \tan^{-1} \left(\frac{0.125}{0.3} \right) = 22.62^\circ$$

$$\theta = 90 - 22.62 = 67.38^\circ$$