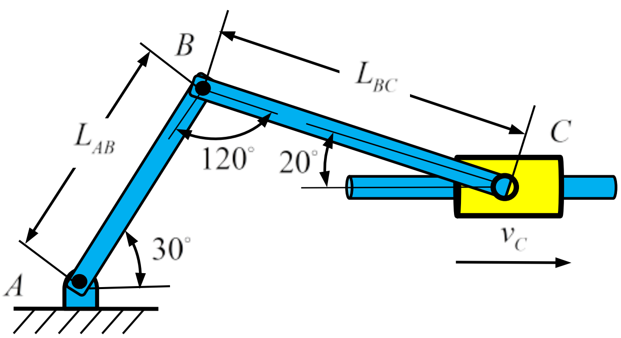
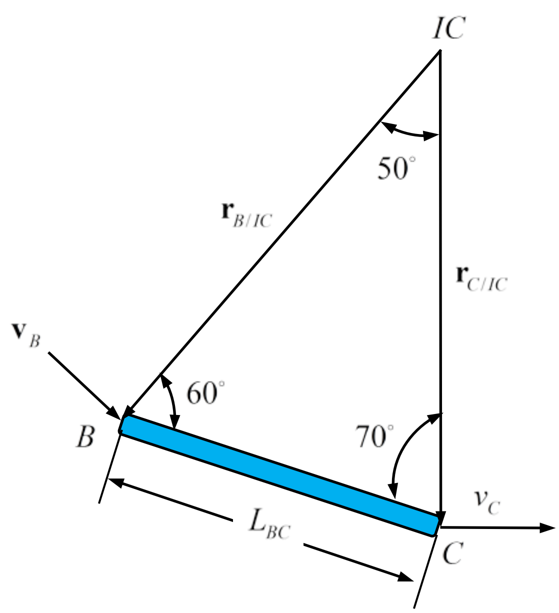
3-6. Block $C$ moves with a normally distributed speed $v_C \sim N(2, 0.2^2)$ m/s. If $L_{AB} = 0.2$ m and $L_{BC} = 0.3$ m, determine the angular velocities of bars $AB$ and $BC$ at the instant show.




With the instantaneous center of zero velocity for $BC$ as shown above, we have

$$\frac{r_{B/IC}}{\sin 70^\circ} = \frac{r_{C/IC}}{\sin 60^\circ} = \frac{L_{BC}}{\sin 50^\circ}$$

$$r_{B/IC} = \frac{L_{BC} \sin 70^\circ}{\sin 50^\circ}$$

$$r_{C/IC} = \frac{L_{BC} \sin 60^\circ}{\sin 50^\circ}$$

$$\omega_{BC} = \frac{v_C}{r_{C/IC}} = \frac{v_C \sin 50^\circ}{L_{BC} \sin 60^\circ}$$

$$\mu_{\omega_{BC}} = \frac{\mu_{v_C} \sin 50^\circ}{L_{BC} \sin 60^\circ} = \frac{2 \sin 50^\circ}{0.3 \sin 60^\circ} = 5.90 \text{ rad/s}$$

$$\sigma_{\omega_{BC}} = \frac{\sigma_{v_C} \sin 50^\circ}{L_{BC} \sin 60^\circ} = \frac{0.2 \sin 50^\circ}{0.3 \sin 60^\circ} = 0.59 \text{ rad/s}$$

$$v_B = \omega_{BC} r_{B/IC} = \left( \frac{v_C \sin 50^\circ}{L_{BC} \sin 60^\circ} \right) \left( \frac{L_{BC} \sin 70^\circ}{\sin 50^\circ} \right) = \frac{v_C \sin 70^\circ}{\sin 60^\circ}$$

$$\omega_{AB} = \frac{v_B}{L_{AB}} = \frac{v_C \sin 70^\circ}{L_{AB} \sin 60^\circ}$$

$$\mu_{\omega_{AB}} = \frac{\mu_{v_C} \sin 70^\circ}{L_{AB} \sin 60^\circ} = \frac{2 \sin 70^\circ}{0.2 \sin 60^\circ} = 10.85 \text{ rad/s}$$

$$\sigma_{\omega_{AB}} = \frac{\sigma_{v_C} \sin 70^\circ}{L_{AB} \sin 60^\circ} = \frac{0.2 \sin 70^\circ}{0.2 \sin 60^\circ} = 1.09 \text{ rad/s}$$

Therefore, $\omega_{BC} \sim N(5.90, 0.59^2)$ rad/s , $\omega_{AB} \sim N(10.85, 1.09^2)$ rad/s . **Ans.**