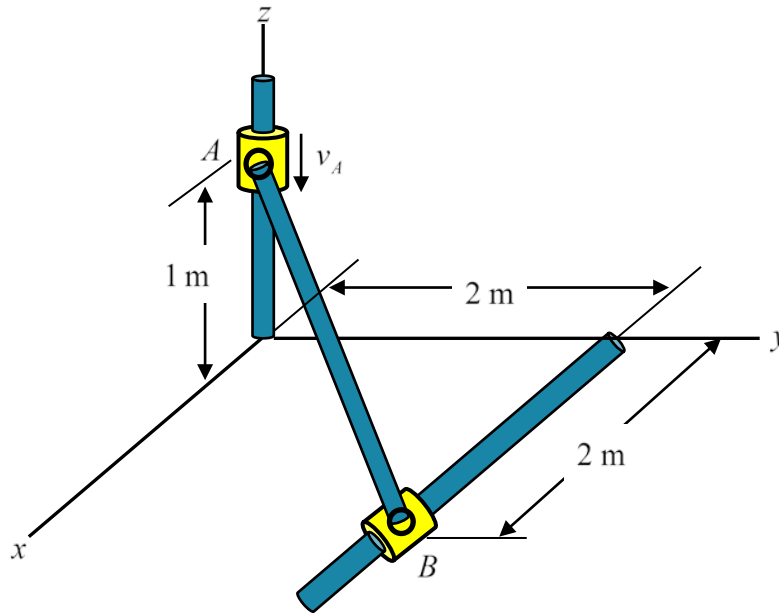


3-4. At the instant shown, the velocity of collar A is $v_A \sim N(6, \sigma_{v_A}^2)$ m/s, and the velocity of collar B is $v_B \sim N(\mu_{v_B}, 0.01^2)$ m/s. Determine σ_{v_B} and μ_{v_B} .



$$\mathbf{r}_{A/B} = -2\mathbf{i} - 2\mathbf{j} + \mathbf{k}$$

$$\mathbf{v}_B = v_B \mathbf{i}$$

$$\mathbf{v}_A - \mathbf{v}_B = -v_A \mathbf{k} - v_B \mathbf{i} = -v_B \mathbf{i} - v_A \mathbf{k}$$

Since $(\mathbf{v}_A - \mathbf{v}_B) \cdot \mathbf{r}_{A/B} = 0$

$$(-v_B)(-2) + (0)(-2) + (-v_A)(1) = 0$$

$$v_A = 2v_B$$

$$\mu_{v_B} = 0.5\mu_{v_A} = 0.5(6) = 3 \text{ m/s}$$

$$\sigma_{v_A} = 2\sigma_{v_B} = 2(0.01) = 0.02 \text{ m/s}$$