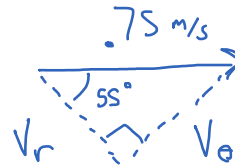
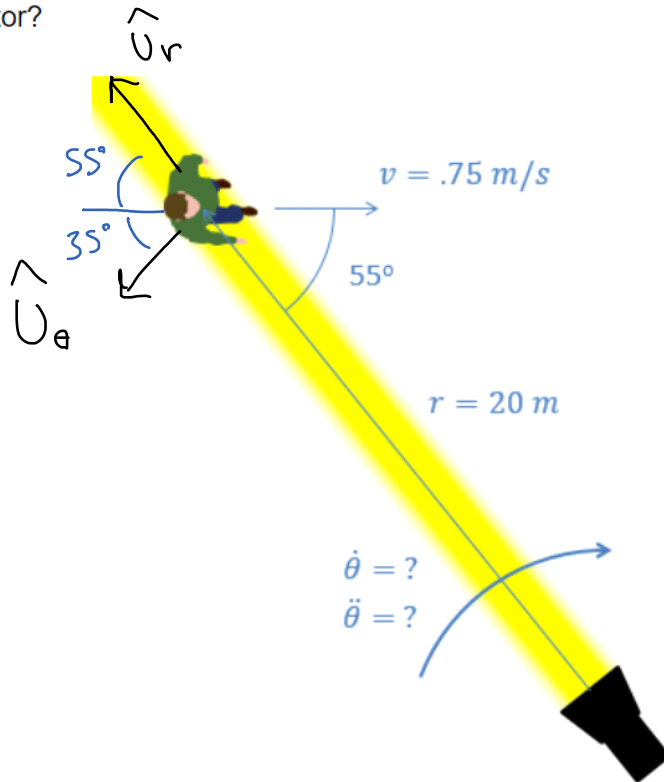


Question 2:

A spotlight is tracking an actor as he moves across the stage. If the actor is moving with a constant velocity as shown below, what values do we need for the spotlight angular velocity ($\dot{\theta}$) and spotlight angular acceleration ($\ddot{\theta}$) so that the spotlight remains fixed on the actor?



$$V_r = -0.75 \cos(55^\circ)$$

$$V_\theta = -0.75 \sin(55^\circ)$$

$$\dot{\theta} \quad V_r = \dot{r} = -0.75 \cos(55^\circ) \rightarrow \dot{r} = -0.4302 \text{ m/s}$$

$$V_\theta = r \dot{\theta} = -0.75 \sin(55^\circ) \rightarrow \boxed{\dot{\theta} = -0.030718 \text{ rad/s}}$$

\uparrow
20 m

$$\ddot{\theta} \quad a_\theta = r \ddot{\theta} + 2 \dot{r} \dot{\theta} = 0 \rightarrow \boxed{\ddot{\theta} = -0.001321 \text{ rad/s}^2}$$

\uparrow \uparrow \uparrow
20 m -0.4302 m/s -0.030718 rad/s