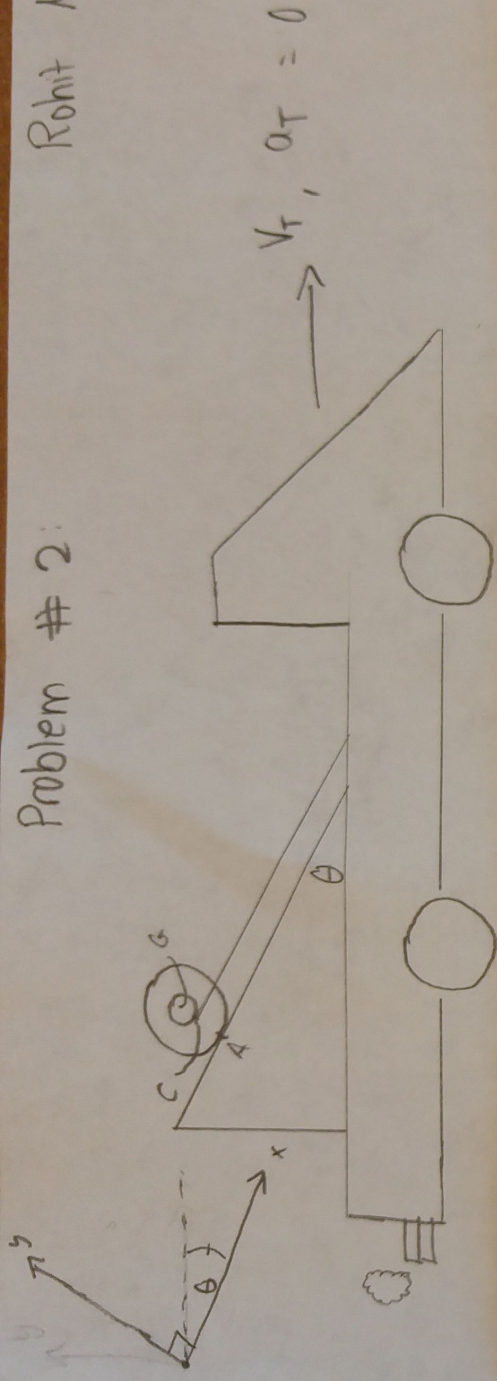


Problem # 2: Rohit Mandav



a.) Find the velocity of point A:

We know that point C is the IC for the spool because the velocity at point C must be 0. This means:

$$\vec{V}_A = \vec{V}_C + \vec{\omega}_{AC} \times \vec{r}_{A/C} : \quad \vec{r}_{A/C} = (\vec{r}_0 - \vec{r}_i) = -(r_0 - r_i) \hat{j}$$

$$\vec{V}_A = \vec{0} + -\omega \cdot (r_0 - r_i) \hat{i} \rightarrow \boxed{\vec{V}_A = -\omega \cdot (r_0 - r_i) \hat{i}}$$

b.) Find the acceleration at point C.

$$i.) \vec{a}_C = r_i \cdot \alpha \hat{i} \leftarrow \alpha \hat{k} \times (r_i \hat{j})$$

$$\vec{a}_C = \vec{a}_G + \alpha \hat{k} \times (r_G \hat{j}) - \omega^2 (r_{C/G}) = r_i \cdot \alpha \hat{i} + (-r_i \cdot \alpha) - \omega^2 (-r_i) = +\omega^2 r_i$$

$$\boxed{a_c = \omega^2 r_i \hat{j}}$$