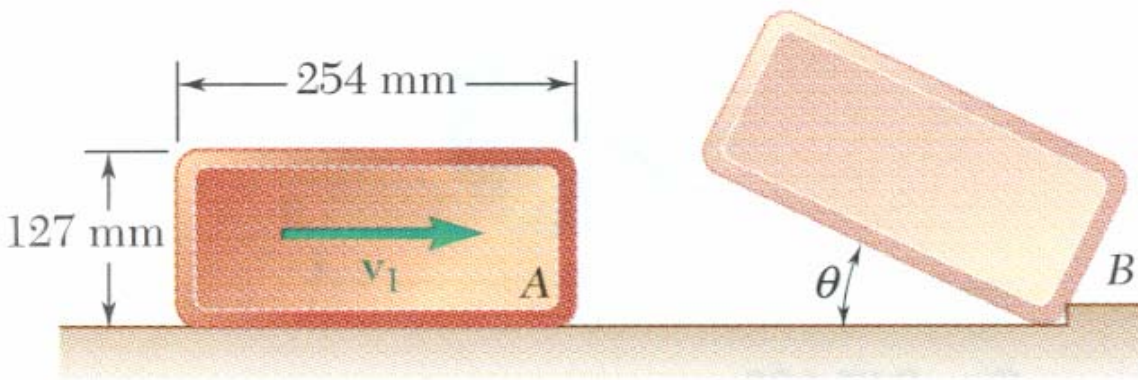
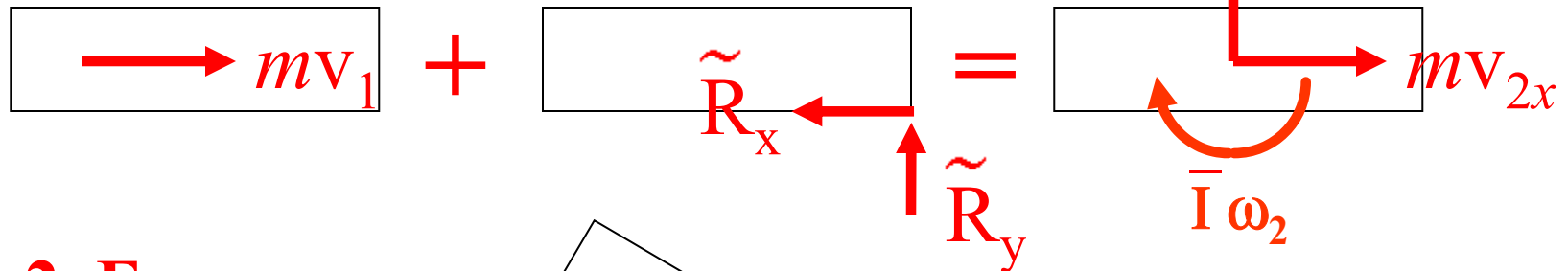


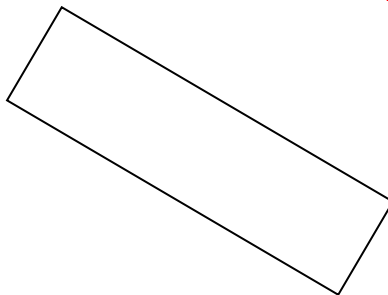
17.115 The uniform rectangular block shown is moving along a frictionless surface with a velocity \bar{v}_1 when it strikes a small obstruction at B . Assuming that the impact between corner A and obstruction B is perfectly plastic, determine the magnitude of the velocity \bar{v}_1 for which the maximum angle θ through which the block will rotate is 30° .

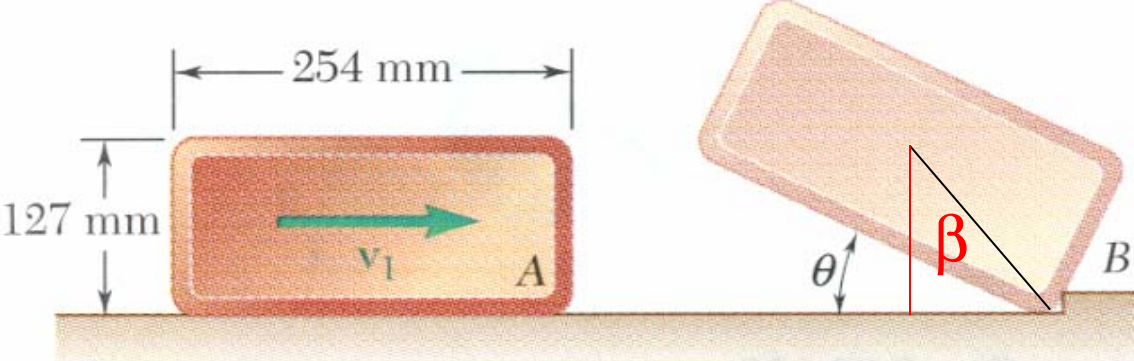


1. Impact:



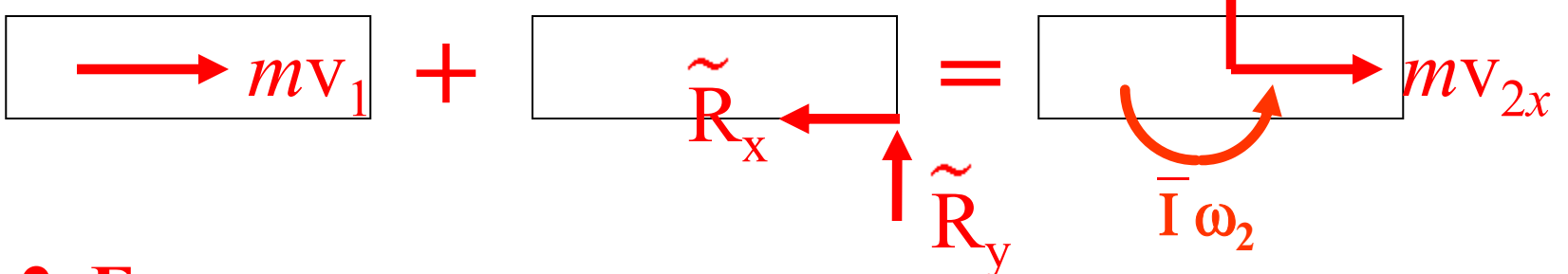
2. Energy:



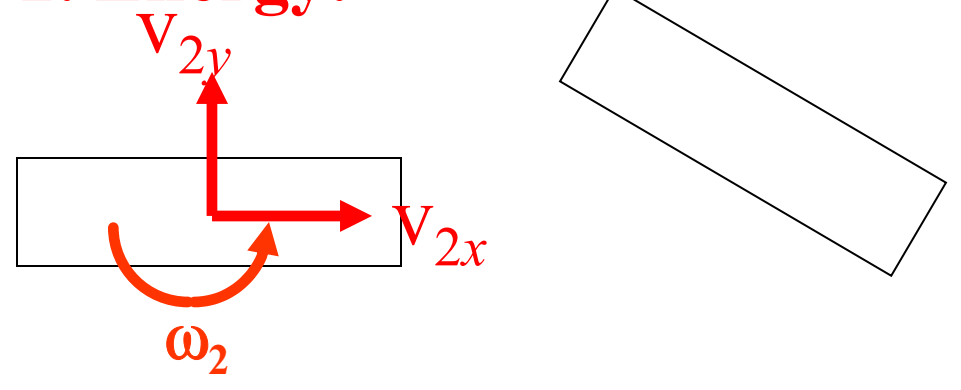


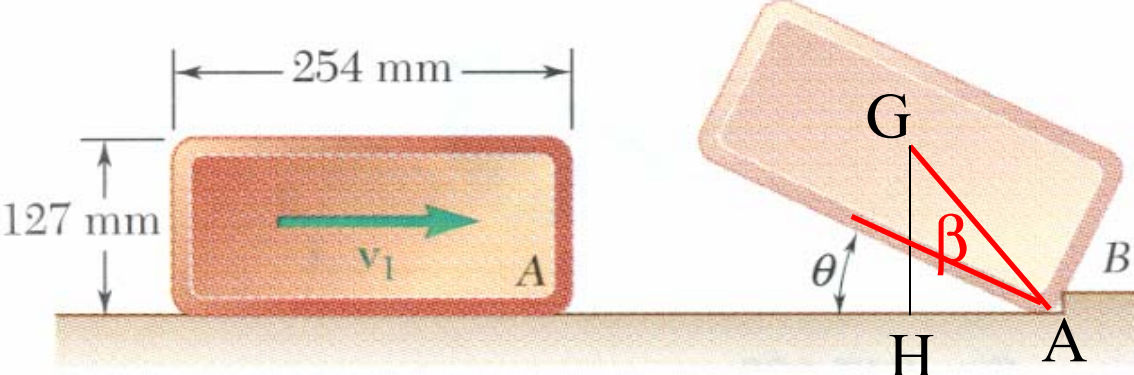
$$\beta = \tan^{-1}(1/2) = 26.57^\circ$$

1. Impact:



2. Energy:

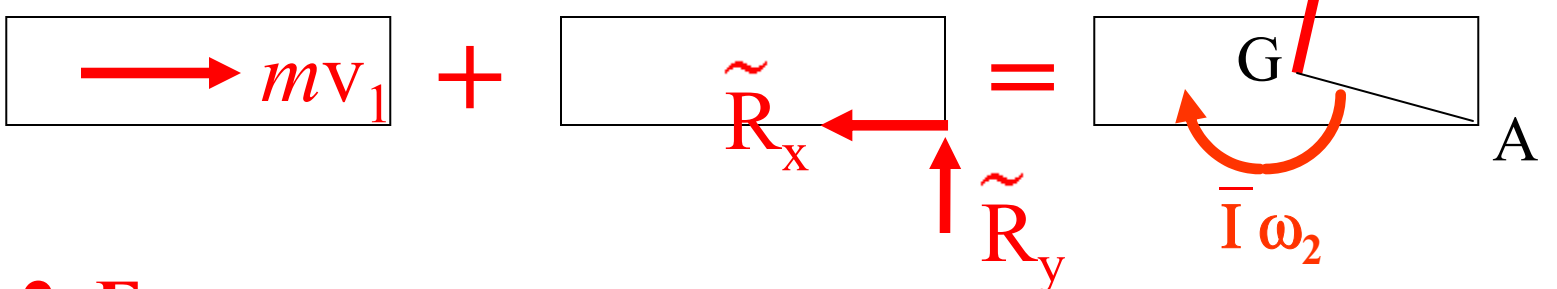




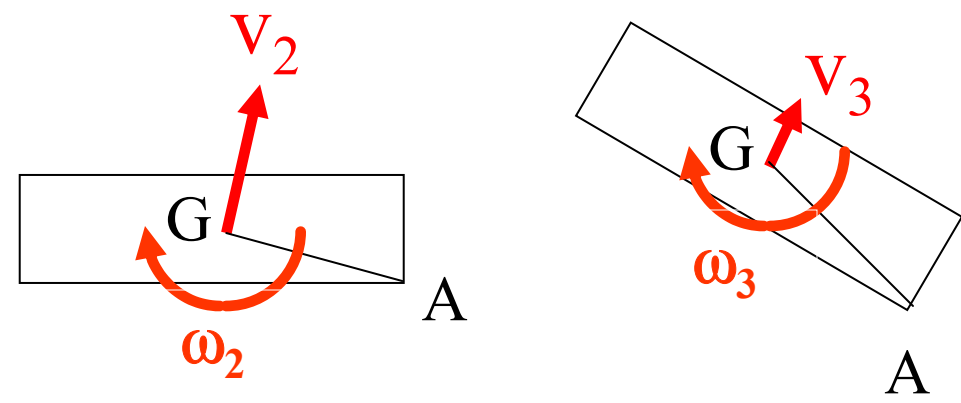
$$\beta = \tan^{-1}(1/2) = 26.57^\circ$$

$$GH = AG \tan(\theta + \beta)$$

1. Impact:



2. Energy:



ω_3 and v_3 may become zero at the highest elevation if that highest elevation $< GA$.

Find v_1 . The highest elevation ($\omega_3=0, v_3=0$) is $\theta = 30^\circ$