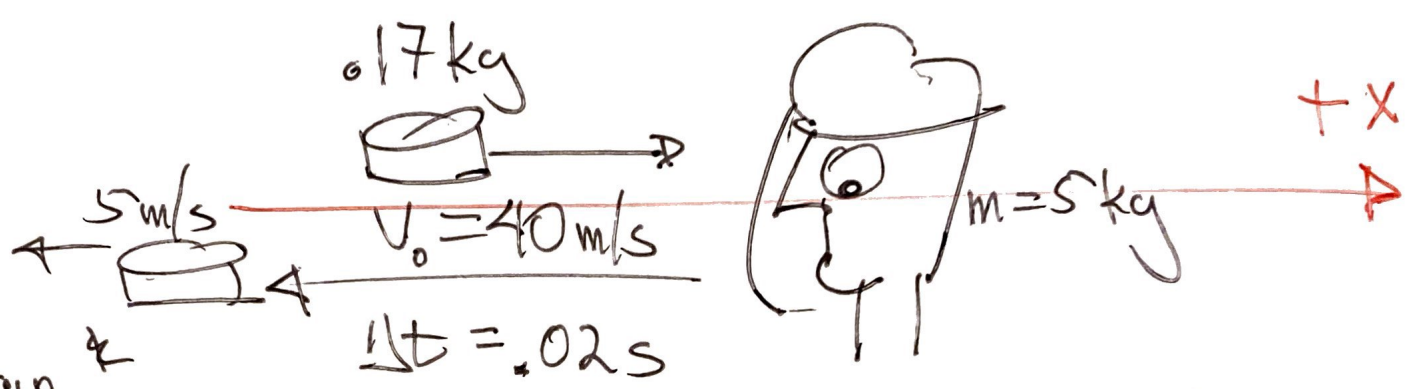
Given



Req'd F_{ave} & a_{head} (in g's)

Assump no g to worry about, Impulse problem

Strategy $F_{ave}\Delta t = \Delta \bar{p}$

Estimate: $m_0 v_0 \cong .2(40\ m/s) = 8\ kg\ m/s$

$\Rightarrow m_f v_{head} = 8\ kg\ m/s \Rightarrow v_{head} = 1.6\ m/s$ in 0.02s ?

$\Rightarrow a \cong \frac{\Delta v}{\Delta t} = \frac{1.6}{1/50} = 90\ m/s^2$

$= 9\ g's$

will be higher because I ignored the rebound!! ouch!

Soln: $\bar{F}_{ave}\Delta t = \Delta p = \bar{p}_f - \bar{p}_0$ ← for puck!

$\bar{p}_0 = m\bar{v}_0 = .17kg \cdot 40\ m/s = 6.8\ kg\ m/s$

$\bar{p}_f = m\bar{v}_f = .17kg(-5m/s) = -.85\ kg\ m/s$

$\Rightarrow \bar{F}_{ave} = \dfrac{-.85\ kg\ m/s - 6.8\ kg\ m/s}{.02\ s} = -382.5\ N$

→ point back to left!

$\Rightarrow \bar{F}_{ave_{head}} = +382.5\ N = m\bar{a}$

$382.5 = 5kg\,\bar{a} \Rightarrow a = 9.8\ m/s = 1g$!

What!? — go back check #'s

$a_{new} = 76.5\ m/s^2$ → better!

Discussion: Totally saved by the estimate being 10x bigger than my first answer. Checked estimate first. Then discovered I had entered #'s wrong on calculator!