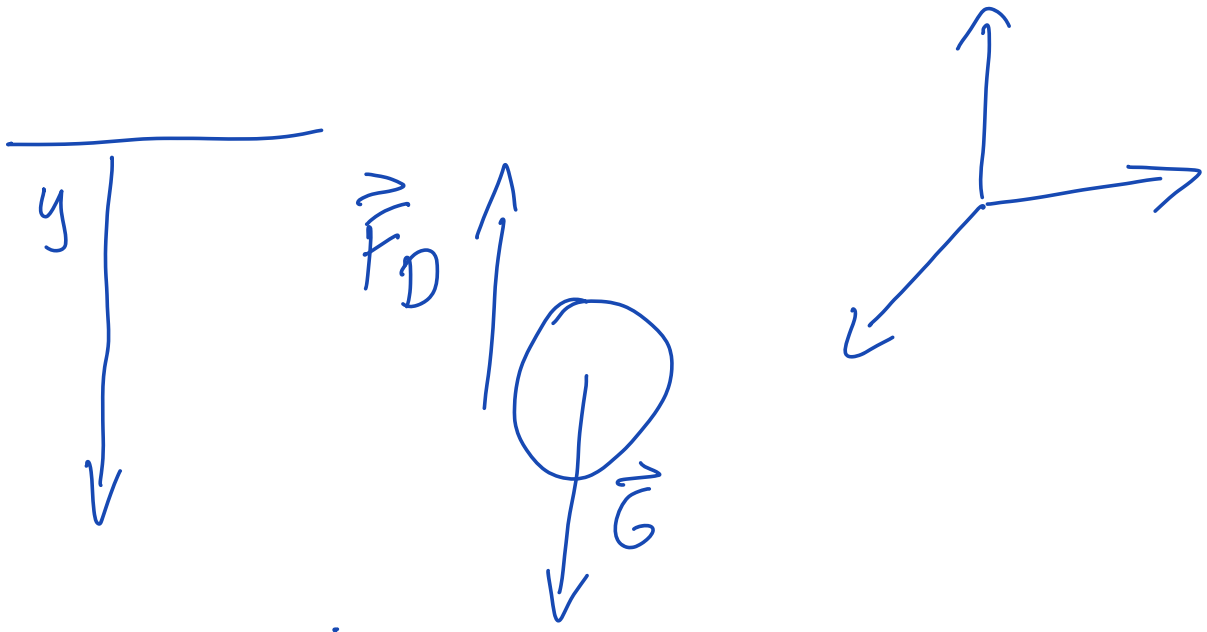
PHY 321 JANUARY 21



$$\vec{F}_{net} = \vec{F}_D + \vec{G}$$

$$= F_{Dy}\vec{j} - mg\vec{j}$$

$$= Dv^2\vec{j} - mg\vec{j}$$

$$\vec{F}_D = \begin{cases} -Dv\vec{v}|v| & \text{(Fast)} \\ -K\vec{v} & \text{(slow)} \end{cases}$$

Two - Dimensions

$$\vec{G} = -mg\vec{j}$$

$$\vec{F}_D = F_{Dx}\vec{i} + F_{Dy}\vec{j}$$

$$\vec{F}_D = -D v_x \vec{i} |\vec{v}| - D v_y \vec{j} |\vec{v}|$$

only 1-D in x

$$F_{net} = +Dv^2 - mg$$

$$= m \cdot a \Rightarrow$$

$$m\frac{dv}{dt} = +Dv^2 - mg$$

$$\frac{dv}{dt} = \left(\frac{D}{m}\right)v^2 - g \qquad \tilde{D}$$

$$\frac{dv}{\tilde{D}v^2 - g} = dt$$

$t_{final} = t \quad t_{initial} = t_0$

$$= v_0$$

$$v_{final} = v$$

$$v_{initial} = v_0 = 0 \ m/s$$

$$\int_0^v \frac{dv'}{\frac{1}{2}v'^2 - g} = \int_0^t dt' = t$$