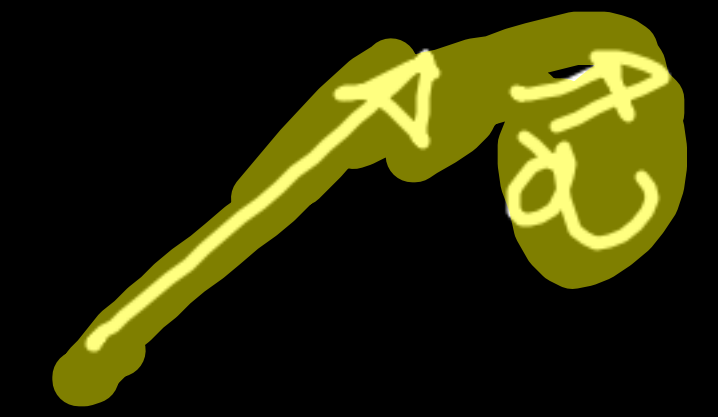


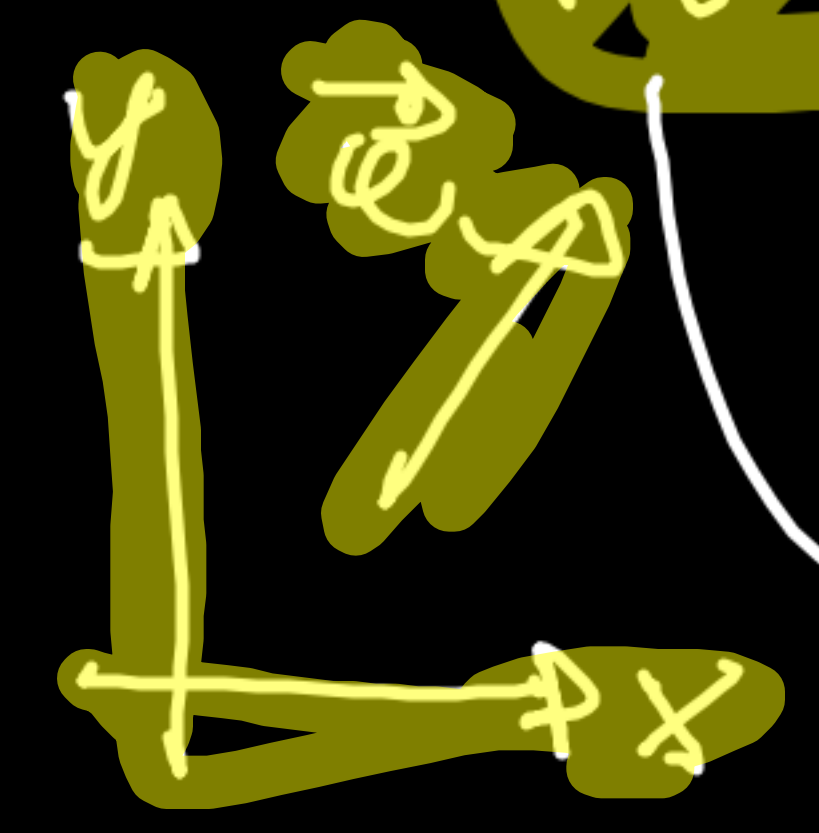
(2D)

$$\vec{a} = \vec{a} t$$



$$\vec{v}(t) = \vec{v}_0 + \vec{a} t$$

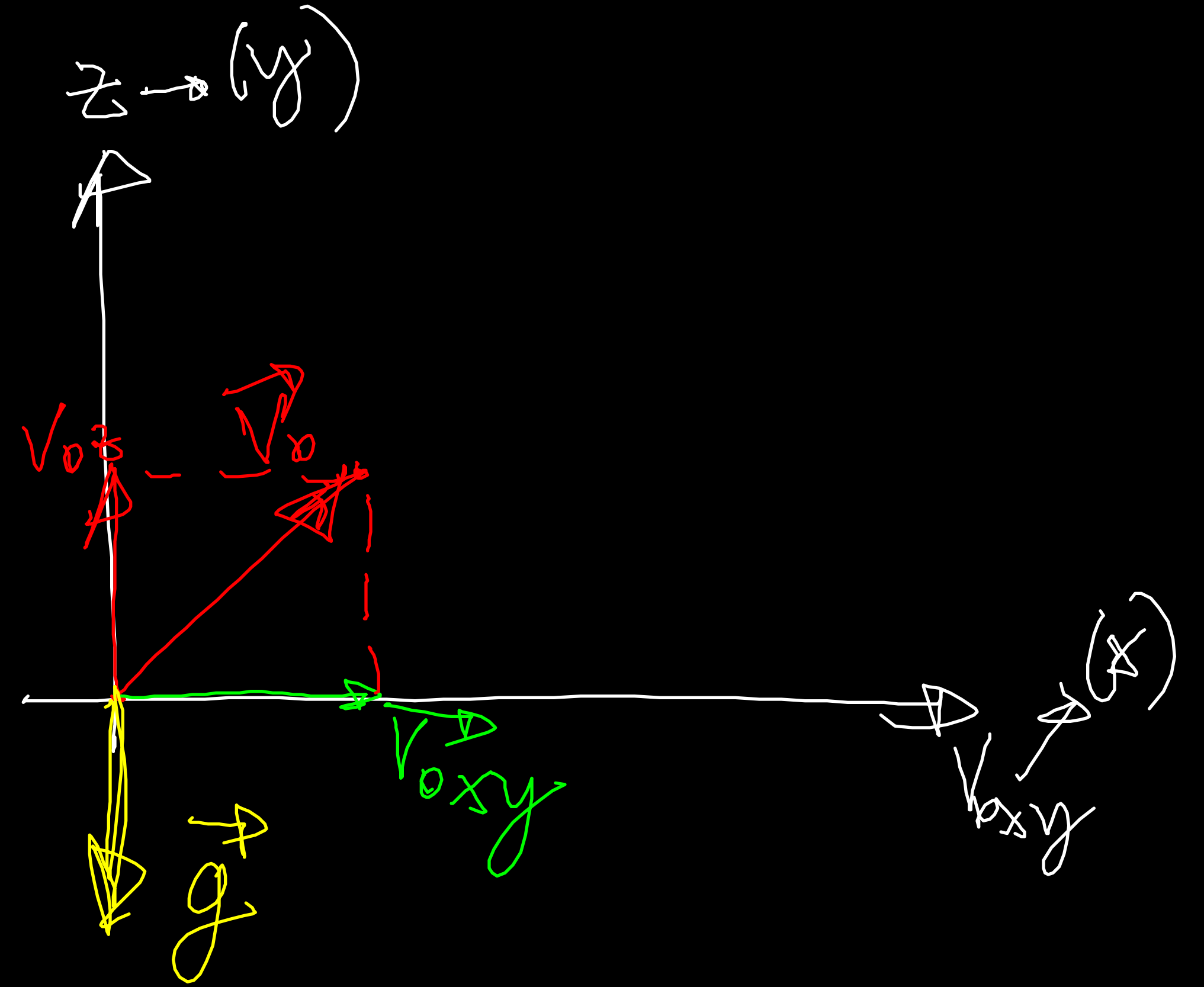
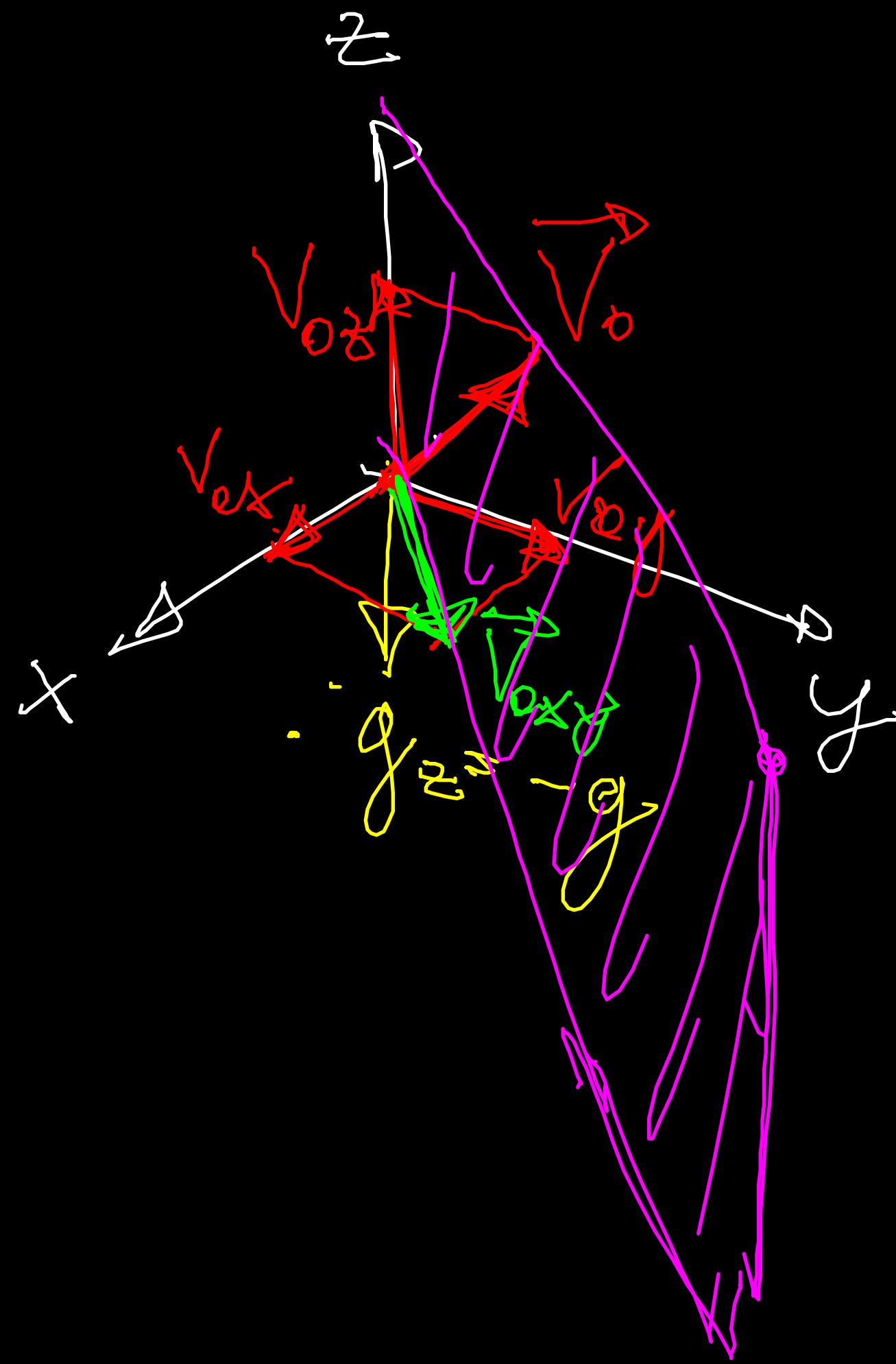
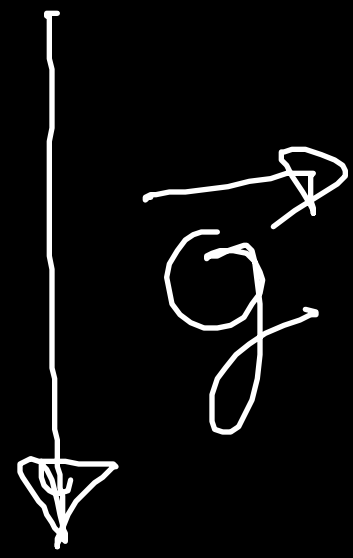
$$\vec{r}(t) = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2} \vec{a} t^2$$



a_x, a_y

$$\begin{cases} x(t) = x_0 + v_{0x} t + \frac{a_x}{2} t^2 \\ y(t) = y_0 + v_{0y} t + \frac{a_y}{2} t^2 \end{cases}$$

MOTO DEL PROIETTILE

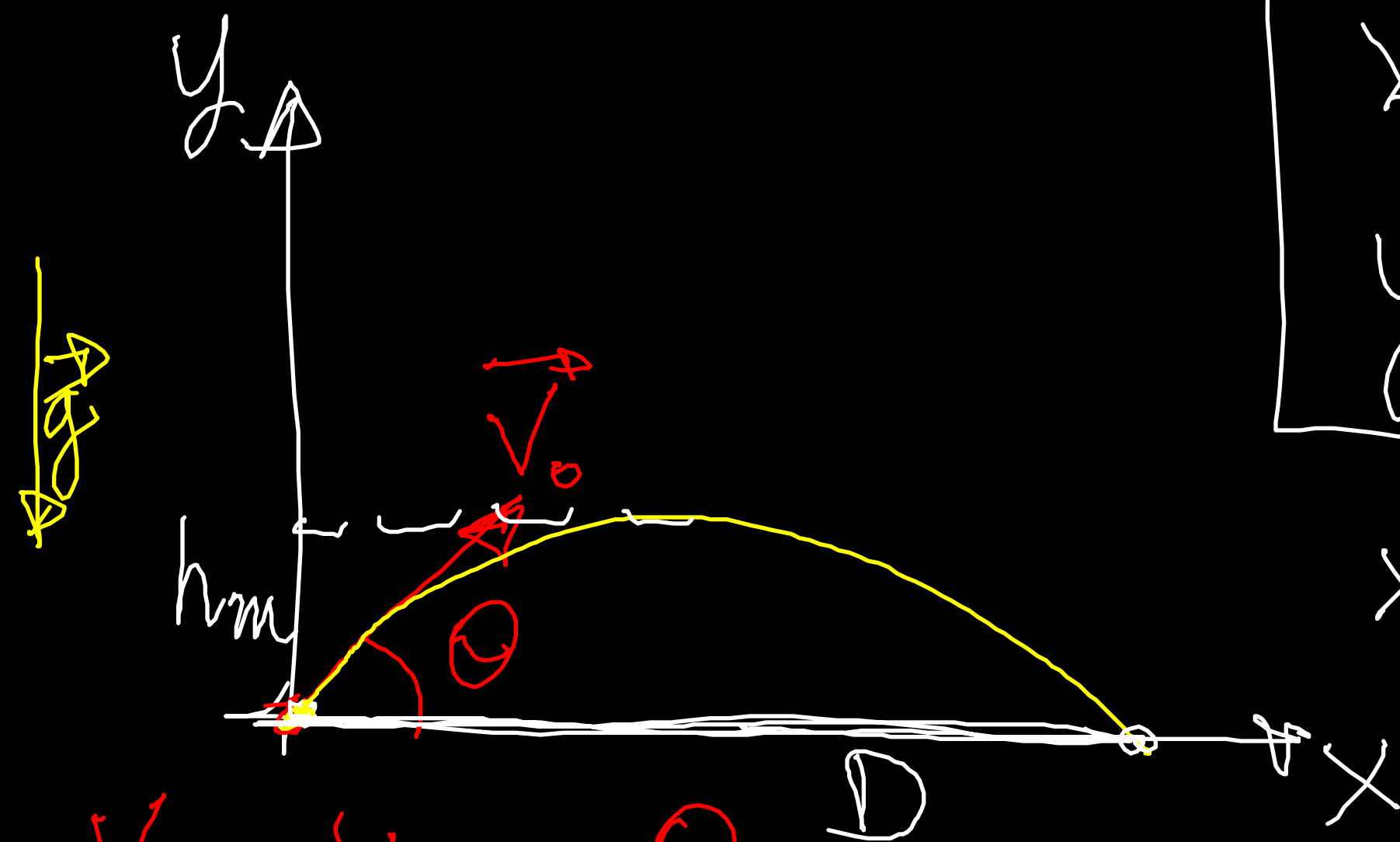


$$x(t) = x_0 + v_{0x}t + \frac{1}{2}a_x t^2$$

$$y(t) = y_0 + v_{0y}t + \frac{1}{2}a_y t^2$$

$$\vec{a} = \vec{g} = (0, -g)$$

MOTO DEL PROIETTILE



$$\begin{cases} x(t) = x_0 + v_{0x}t \\ y(t) = y_0 + v_{0y}t - \frac{1}{2}gt^2 \end{cases}$$

$$\frac{x - x_0}{v_{0x}} = t$$

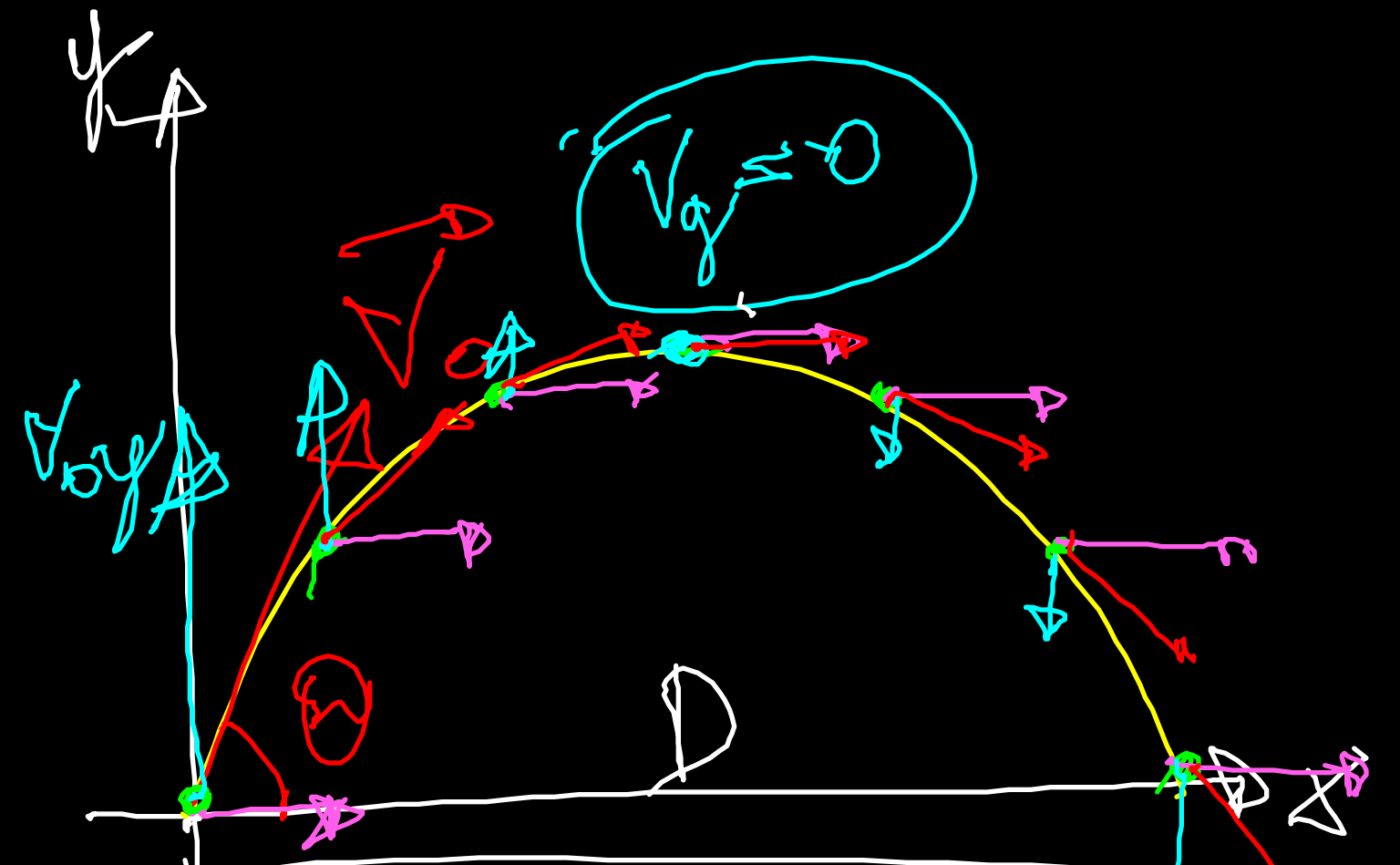
$$y - y_0 = \frac{v_{0y}}{v_{0x}}(x - x_0) - \frac{1}{2}g \frac{(x - x_0)^2}{v_{0x}^2}$$

$$v_{0x} = v_0 \cos \theta$$

$$v_{0y} = v_0 \sin \theta$$

$$x_0 = 0 \quad y_0 = 0$$

$$y = \frac{v_{0y}}{v_{0x}}x - \frac{1}{2} \frac{g}{v_{0x}^2} x^2 = \tan \theta x - \frac{g x^2}{2v_0^2 \cos^2 \theta}$$



$$y = \tan \theta x - \frac{g x^2}{2 V_0^2 \cos^2 \theta}$$

$$0 = V_{0y} - g t_s \Rightarrow$$

$$h_m = y(t_s) =$$

$$= \frac{V_{0y}^2}{g} - \frac{1}{2} g \frac{V_{0y}^2}{g^2} =$$

$$t_s = \frac{V_{0y}}{g}$$

~~$$t_v = 2 t_s$$~~

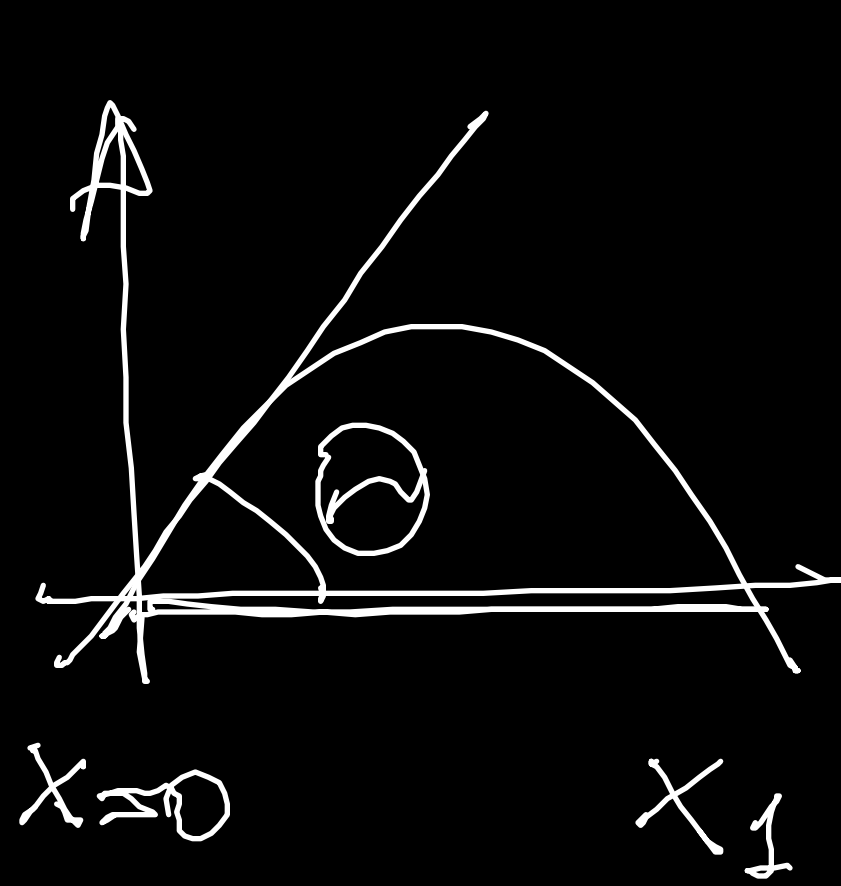
$$\frac{V_{0y}^2}{2g} = h_m$$

$\frac{d}{dt}$

$$x = V_{0x} t \quad V_x = V_{0x}$$

$$y = V_{0y} t - \frac{1}{2} g t^2 \Rightarrow V_y = V_{0y} - g t$$

$$y = \tan \theta x - \frac{g x^2}{2 v_0^2 \cos^2 \theta}$$



$$\tan \theta x - \frac{g x^2}{2 v_0^2 \cos^2 \theta} = 0$$

$$\tan \theta - \frac{g x_1}{2 v_0^2 \cos^2 \theta} = 0$$

$$D = GWTATA$$

$$\Rightarrow x_1$$

$$x_1 \Rightarrow \frac{2 v_0^2 \tan \theta \cos^2 \theta}{g}$$

$$x_1 = \frac{2 v_0^2 \sin \theta \cos \theta}{g}$$

$$x_1 = \frac{v_0^2 \sin(2\theta)}{g}$$

$$2\theta = \frac{\pi}{2}$$

$$\theta = \frac{\pi}{4}$$