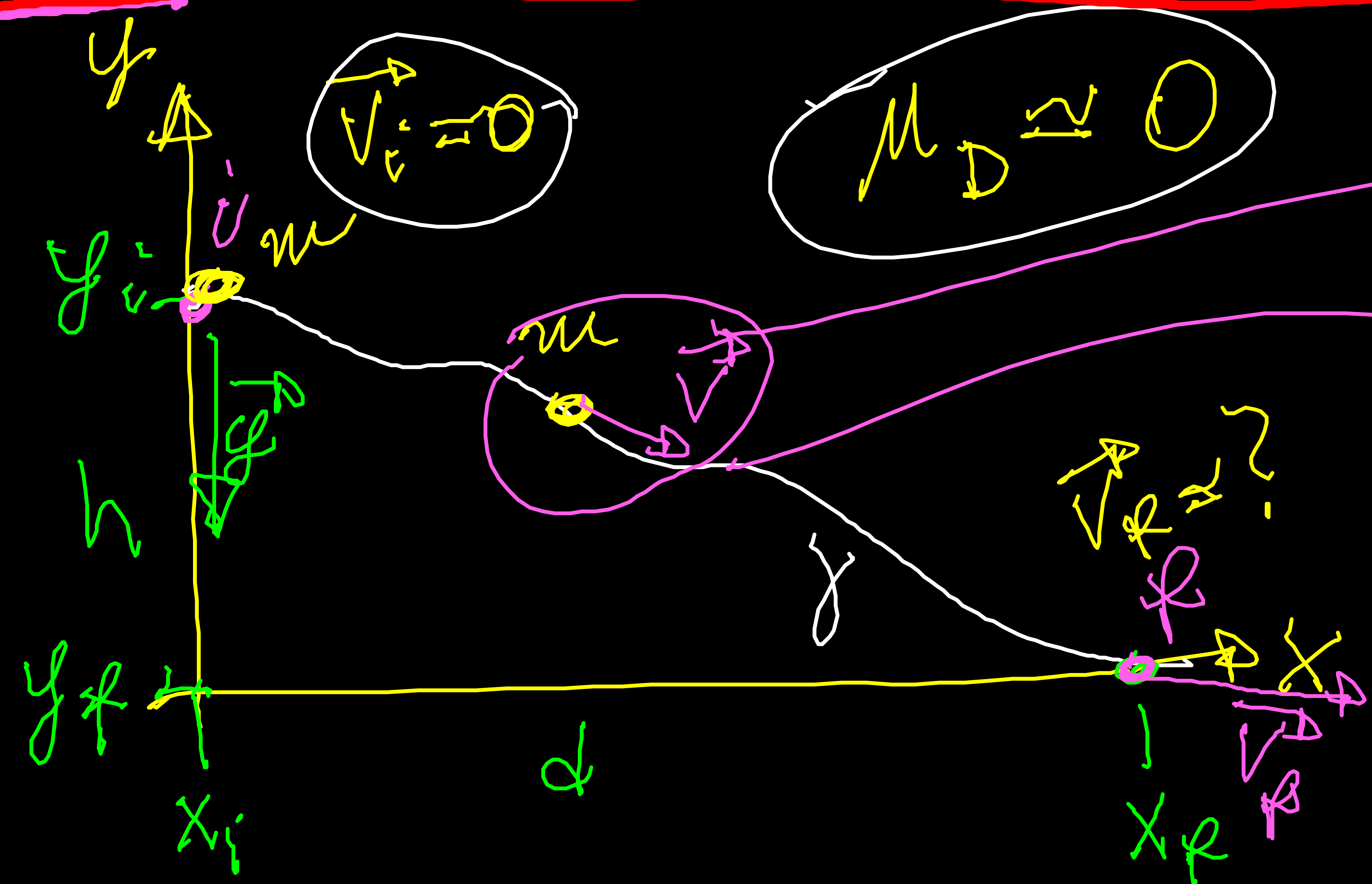
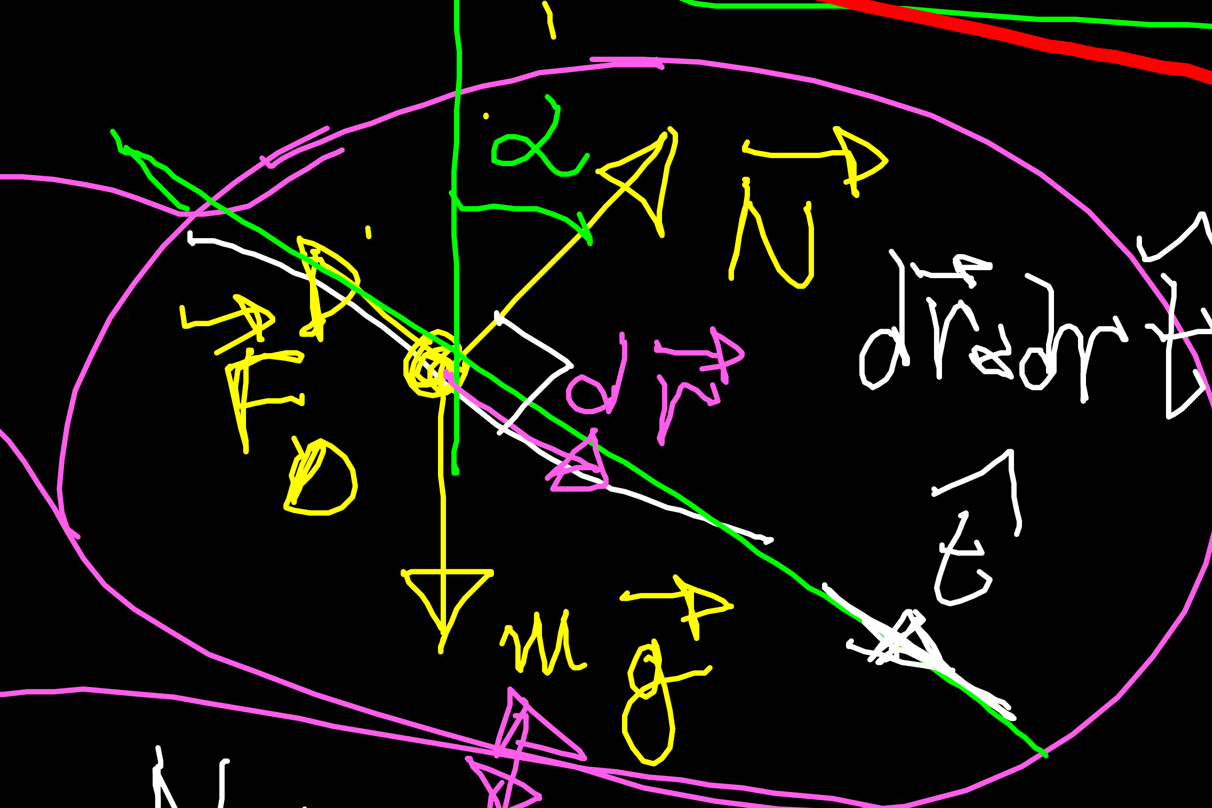
TEOREMA DELL'ENERGIA CINETICA

$$\boxed{\mathcal{L}_{TOT} = K_f - K_i = \Delta K}$$

$$K = \frac{1}{2} m V^2$$

$$\mathcal{L}_{TOT} = \sum_{i=1}^{n} \mathcal{L}_n = \sum_{i=1}^{n} \int_{i,\gamma}^{f} \vec{F}_i(\vec{r}) \cdot d\vec{r}$$





$$N \cos\alpha = mg$$

$$F_D = \mu_D N \cos\alpha$$

$$m a_t = mg \sin\alpha - \mu_D m \cos\alpha$$

$$\mathcal{L}_T = \Delta K = V_f^2 \frac{m}{2}$$

$$= \mathcal{L}_{F_D} + \cancel{\mathcal{L}_N} + \mathcal{L}_P$$

$$\vec{F}_D \cdot d\vec{r} < 0 \qquad \vec{N} \cdot d\vec{r} = 0$$

$$\mathcal{L}_P = -mg(y_f - y_i) = mgh$$

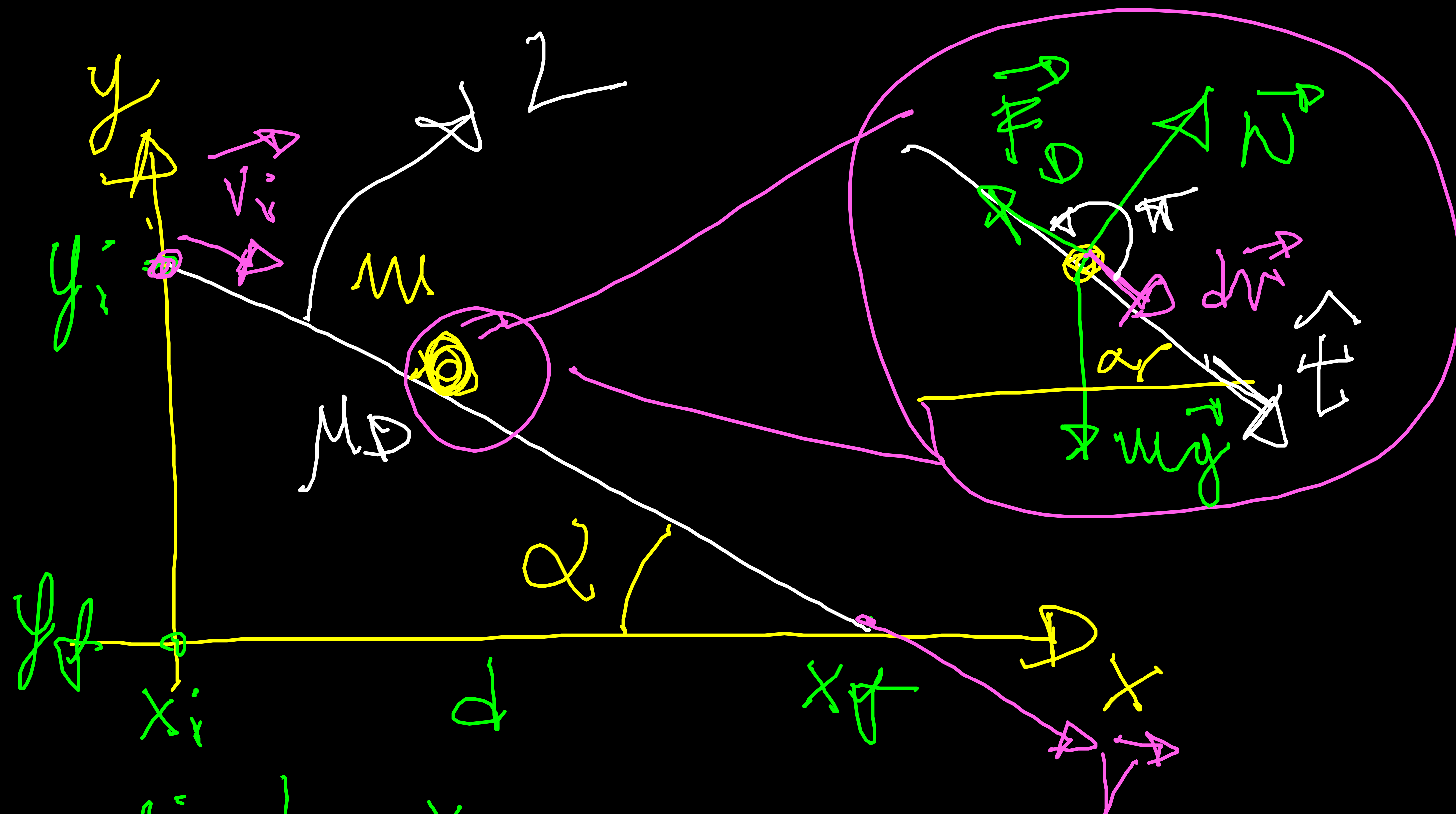
Se $\mu_D \simeq 0 \Rightarrow \mathcal{L}_{F_D} \simeq 0$

$y_i = h \qquad x_i = 0$

$y_f = 0 \qquad x_f = d$

$$\mathcal{L}_{TOT} = \mathcal{L}_P = mgh = \frac{m}{2} V_f^2$$

$$\boxed{V_f = \sqrt{2gh}}$$



$y_i = h \qquad x_i = 0$

$y_f = 0 \qquad x_f = d$

$|\vec{v}_i| = v_0 \qquad |\vec{v}_f| = ?$

L = IPOTENUSA

$L \sin\alpha = h$

$$\mathcal{L}_T = \Delta K = \frac{1}{2} m (v_f^2 - v_i^2)$$

$$\mathcal{L}_T = \mathcal{L}_{F_D} + \cancel{\mathcal{L}_N} + \mathcal{L}_P$$

$$\mathcal{L}_P = -mg(y_f - y_i) = mgh > 0$$

$$\mathcal{L}_{F_D} = \int_i^f \vec{F}_D \cdot d\vec{r} = \int_i^f (\mu_D m g \cos\alpha)\,\hat{t} \cdot d\vec{r}$$

$$= \mu_D m g \cos\alpha \underbrace{\int_i^f (-dr)}_{= \frac{h}{\sin\alpha} = L}$$

$$= -\mu_D m g h \,\mathrm{cotan}\,\alpha$$

$$\frac{1}{2}m\left(V_f^2 - V_i^2\right) = mgh - \mu_D mgh\cot\alpha$$

$$V_f^2 = V_0^2 + gh\left(1 - \mu_D \cot\alpha\right)$$