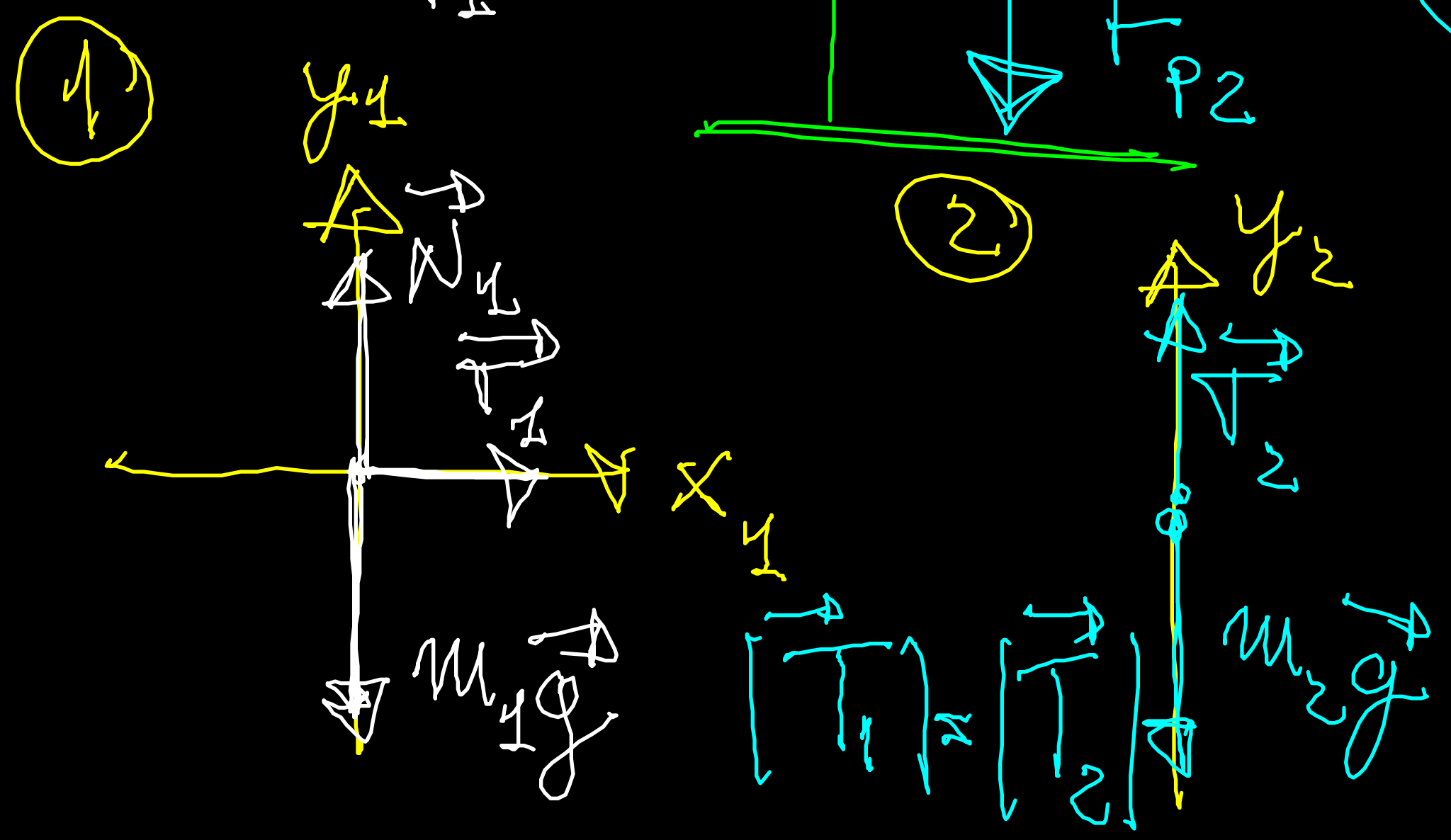
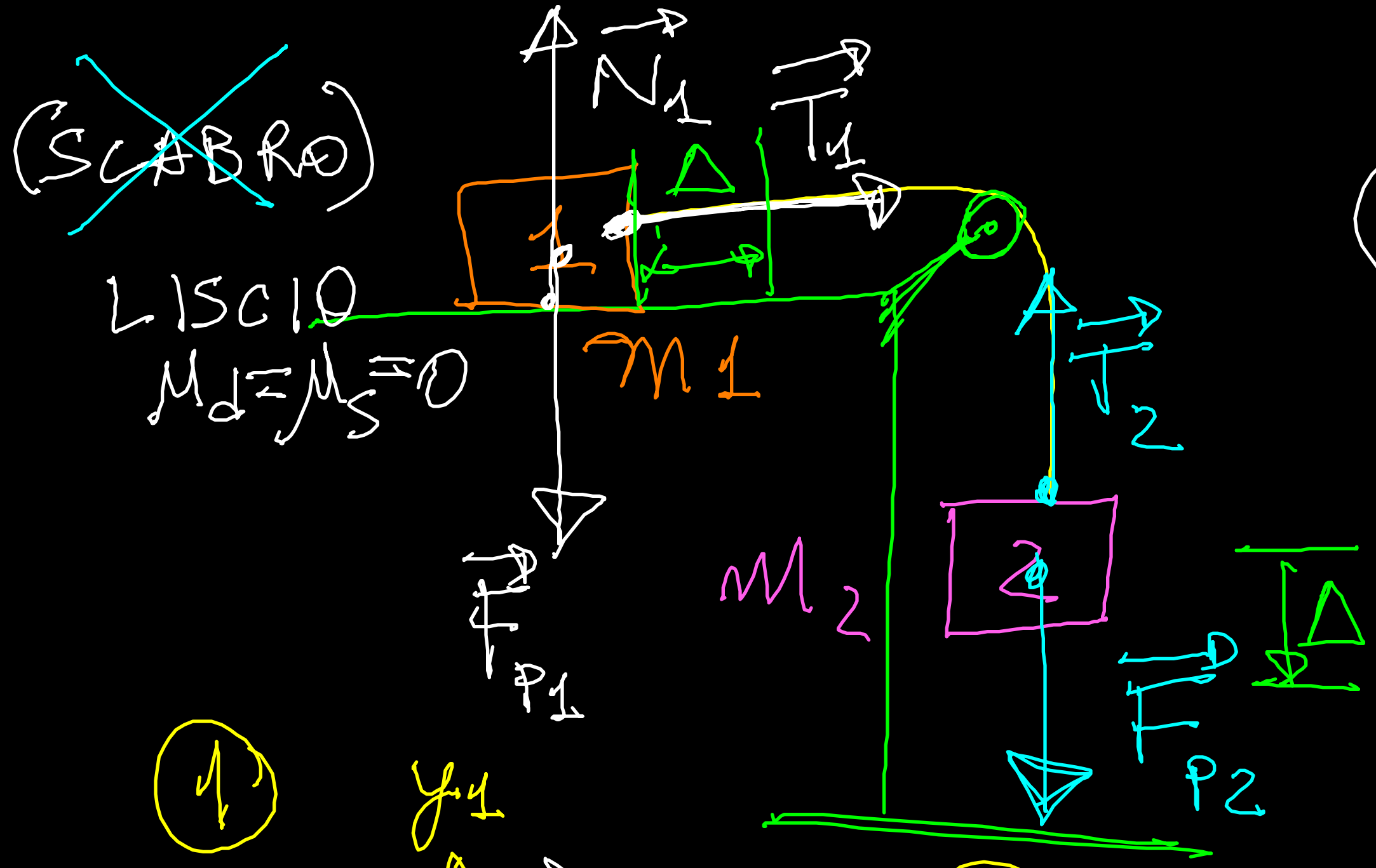


# TENSIONE



CORPO 1

$\textcircled{x_1} \quad T = m_1 a$   
 $\textcircled{y_1} \quad N_1 - m_1 g = 0$

$|\vec{T}_1| = |\vec{T}_2| = T$

$|\vec{a}_1| = |\vec{a}_2|$   
 $\parallel \parallel$   
 $0 < a = a_{1x} = a_{2y}$

CORPO 2

$\textcircled{y_2} \quad T - m_2 g = m_2 a$

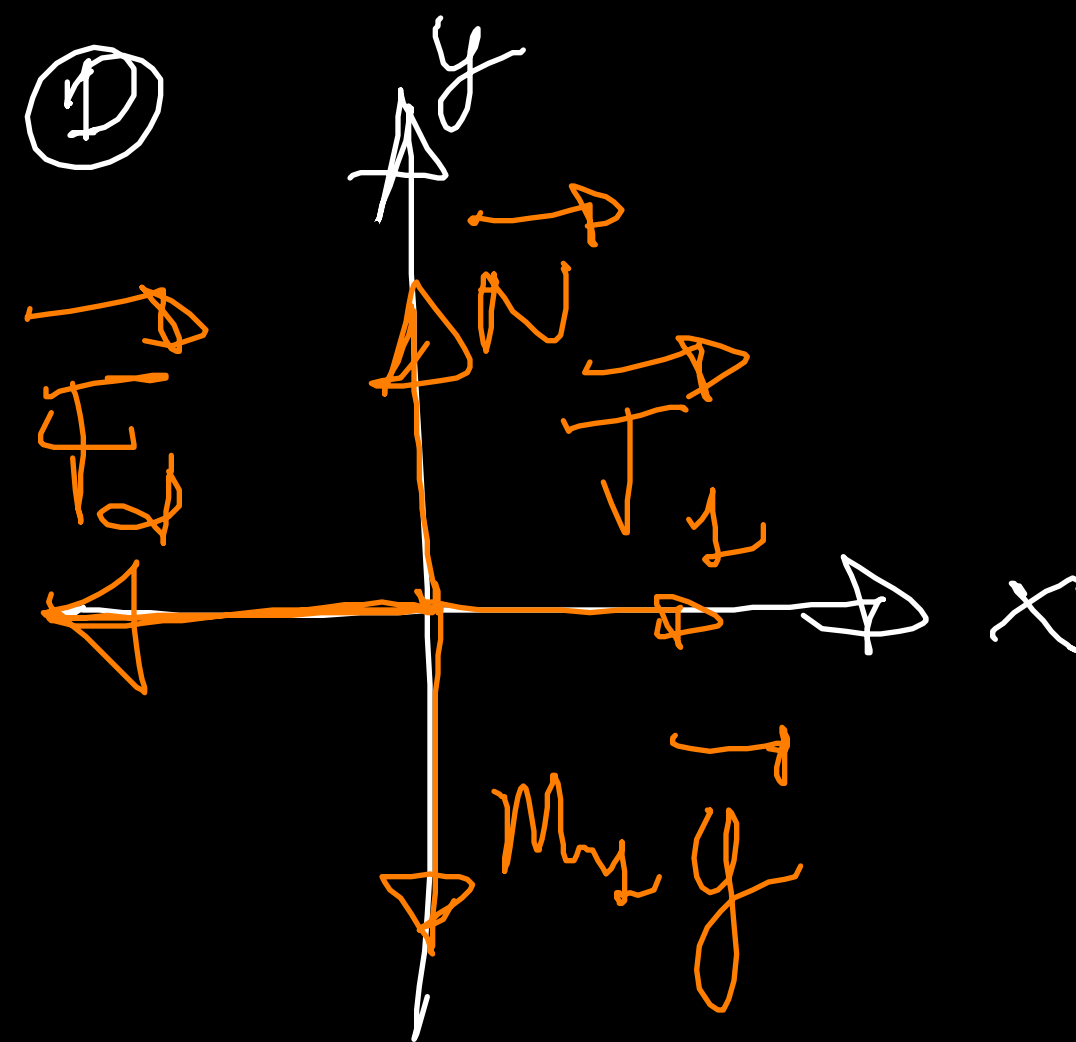
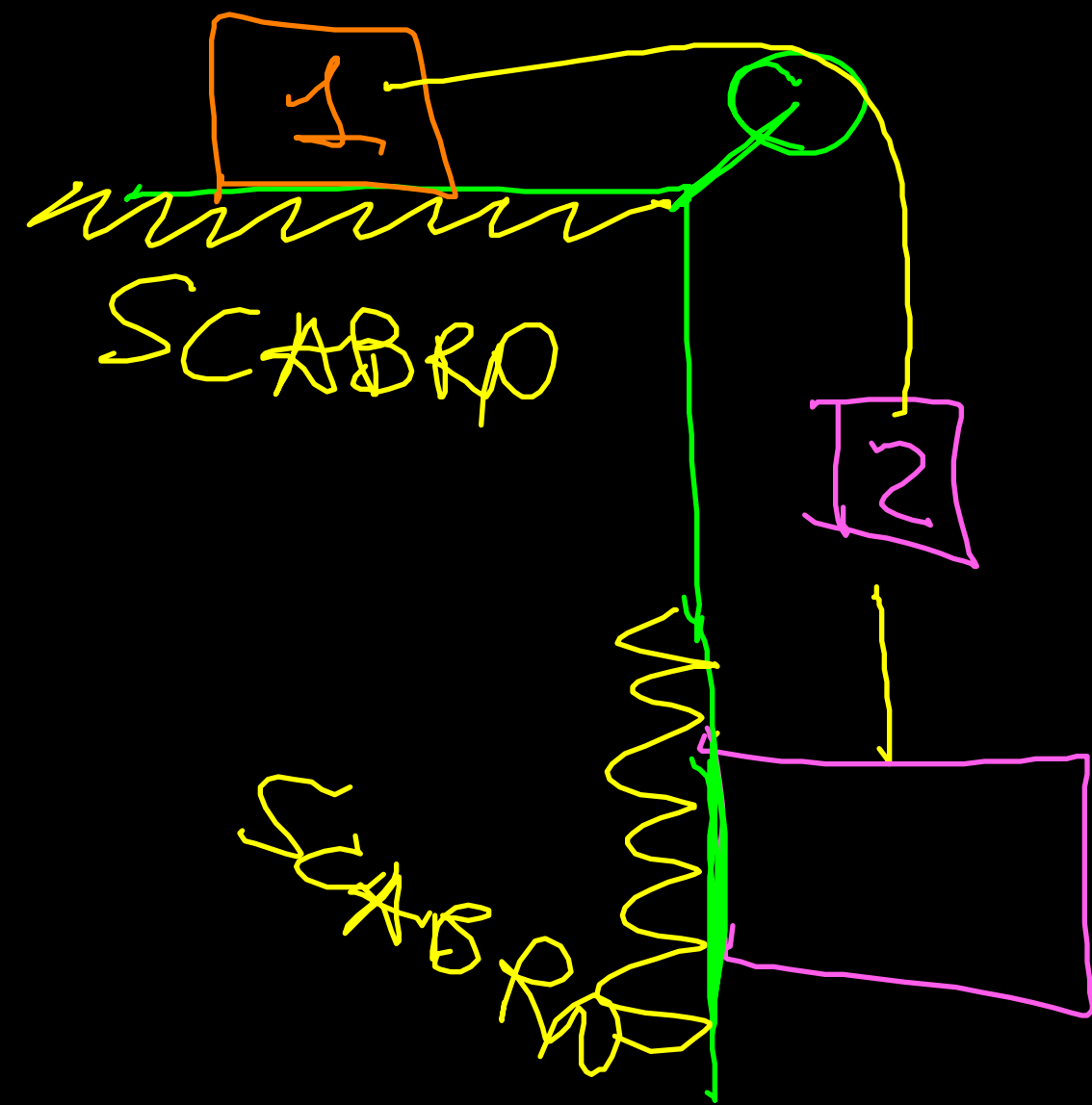
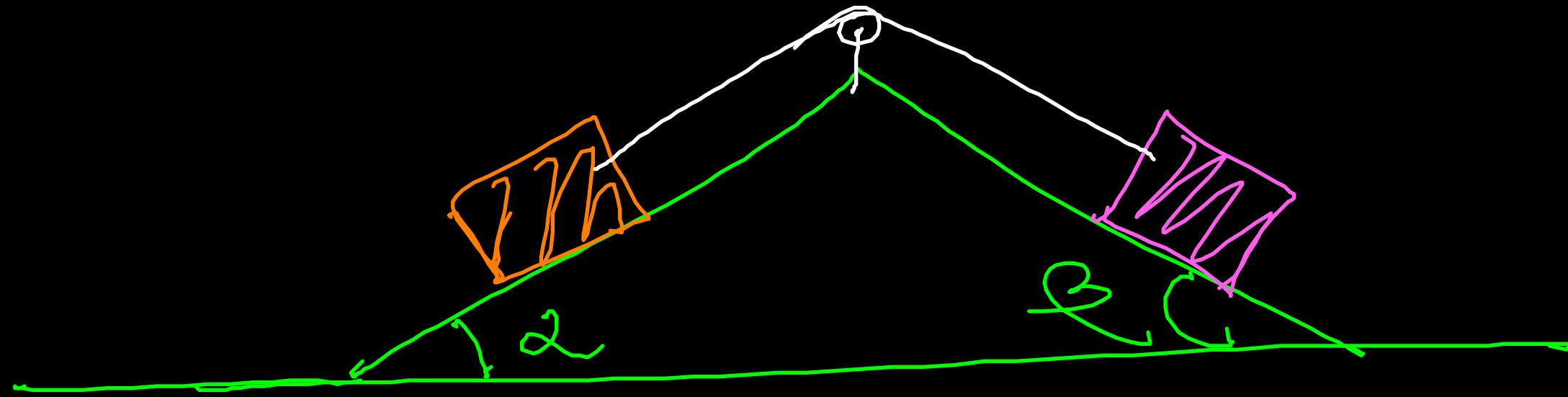
$N_1 = m_1 g$

$\textcircled{x_1} = \textcircled{y_2} \quad T - T + m_2 g = (m_1 + m_2) a$

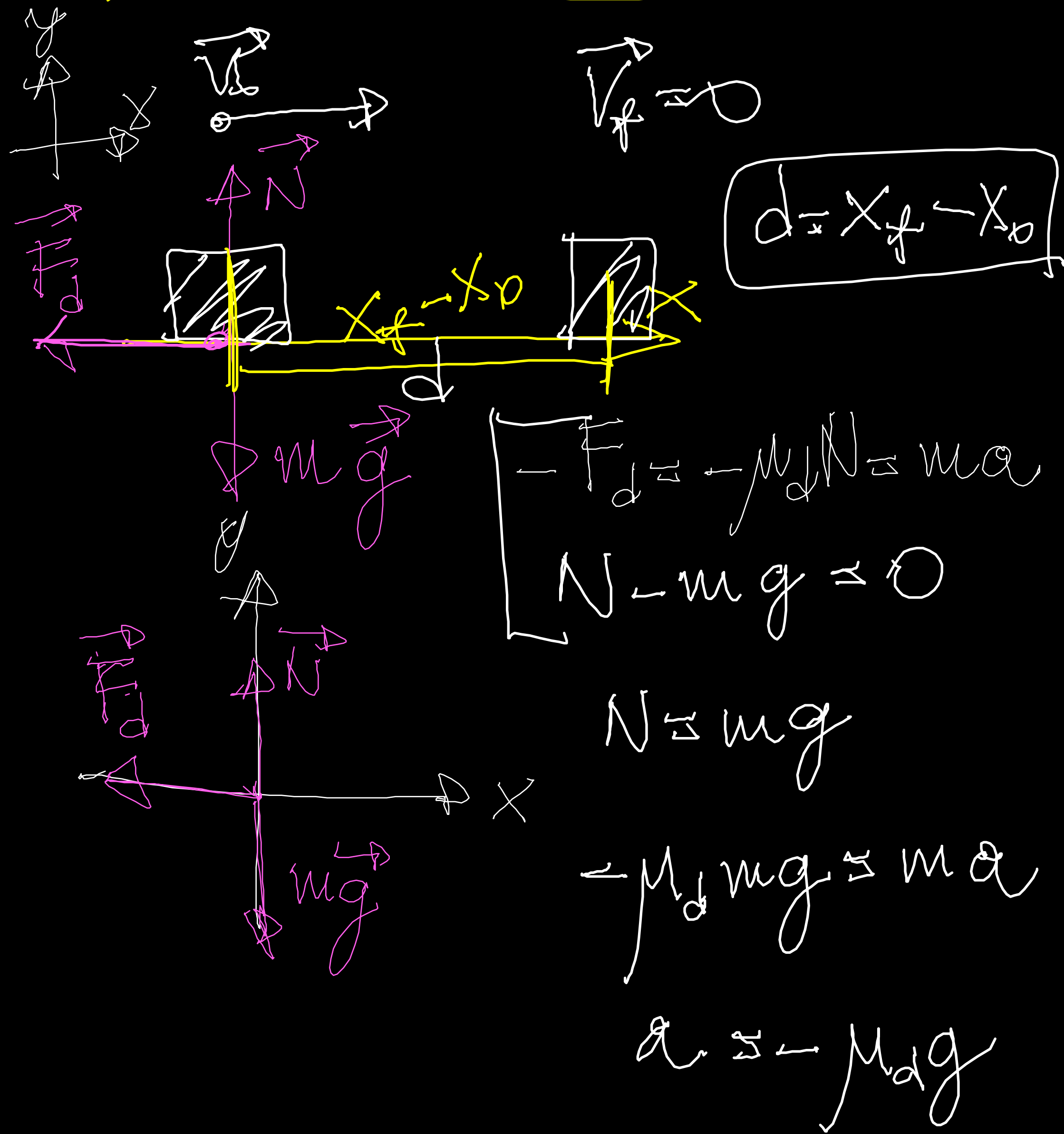
$a = \frac{m_2}{m_1 + m_2} g$

$T = \frac{m_1 m_2 g}{m_1 + m_2}$

VARIANT 1



# ATTRITO DINAMICO



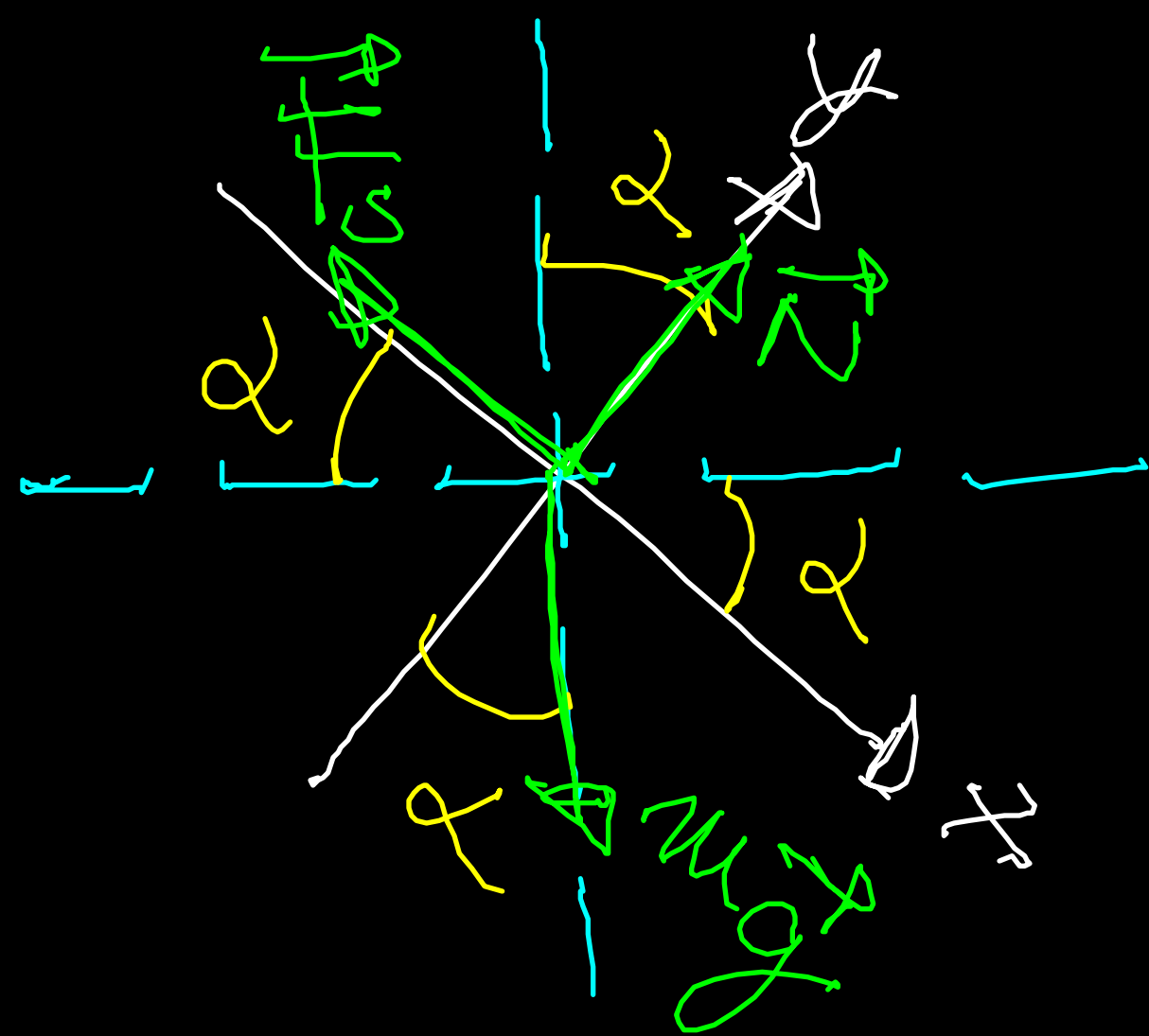
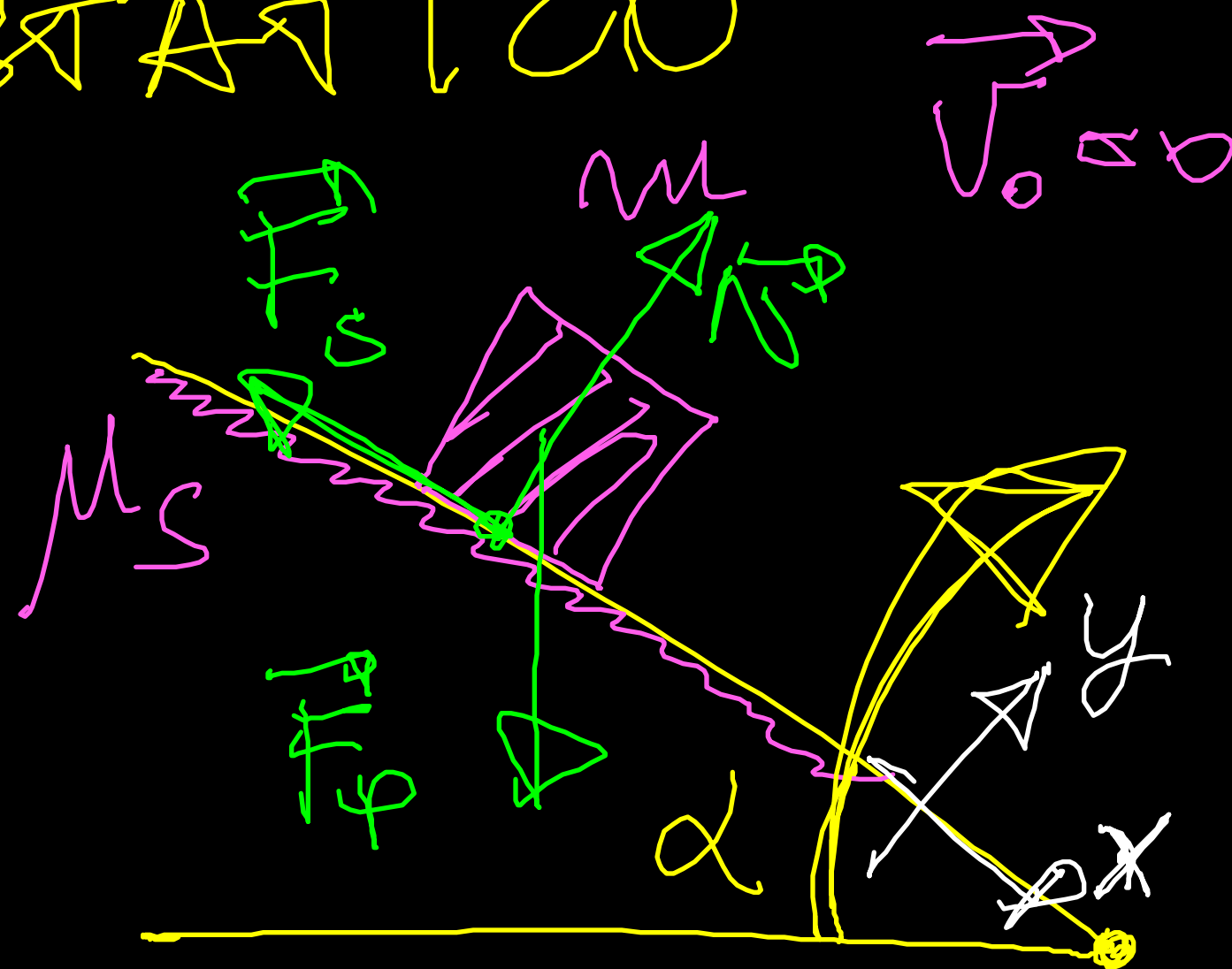
$$v_f^2 - v_0^2 = 2a(x_f - x_0)$$

(b)  $t = 0$  (f)  $\rightarrow t_{arresto}$

$$-v_0^2 = -2\mu_d g d$$

$$d = \frac{v_0^2}{2\mu_d g}$$

# ATTRITO STATICO



$$\textcircled{x} \quad \underline{-F_s + mg \sin \alpha = 0}$$

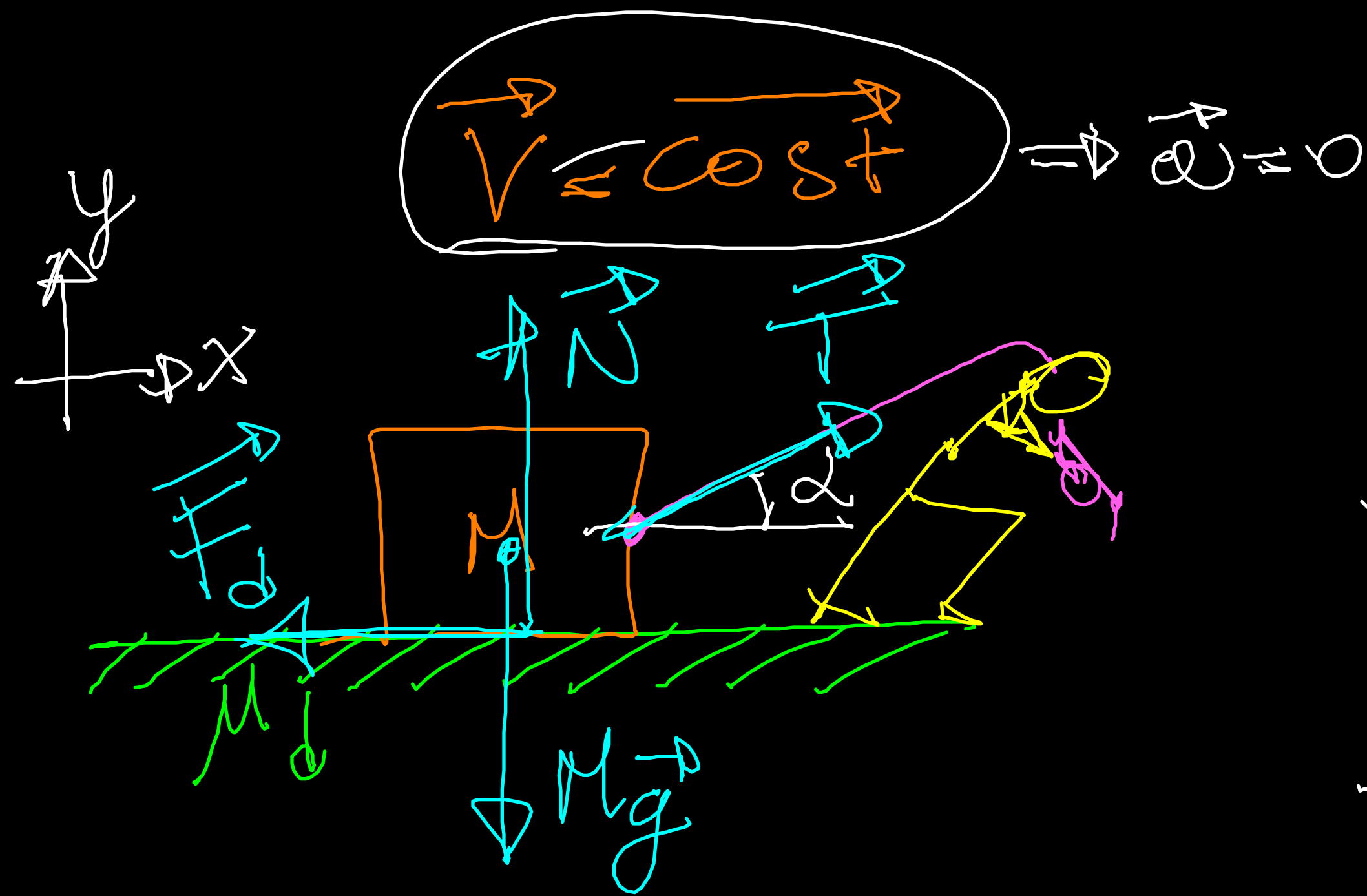
$$\textcircled{y} \quad N - mg \cos \alpha = 0$$

$$mg \sin \alpha = F_s \leq \mu_s N$$

$$\mu \cancel{g} \frac{\sin \alpha}{\cos \alpha} \leq \mu_s \cancel{mg} \frac{\cos \alpha}{\cos \alpha}$$

$$\mu_s \geq \tan \alpha \quad \tan \alpha_0 = \mu_s$$

$$\alpha \in \left[ 0, \frac{\pi}{2} \right]$$

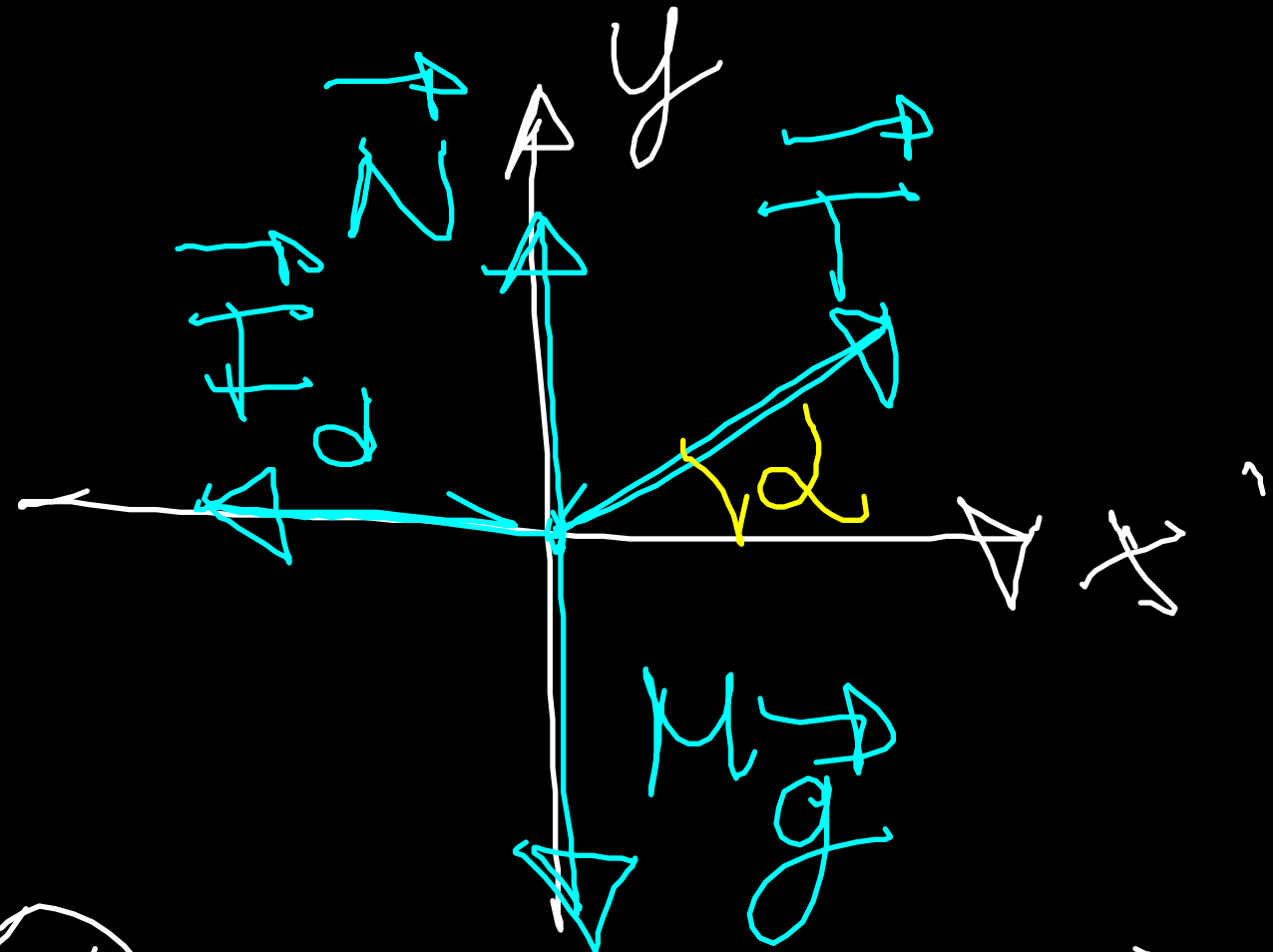


$$\frac{T \cos \alpha}{m_d} = N$$

$$\frac{T \cos \alpha}{m_d} + T \sin \alpha - Mg = 0$$

$$T (\cos \alpha + \mu_d \sin \alpha) = Mg$$

$\alpha_{\min} \rightarrow T_{\min}$



$$T(\alpha) = \frac{Mg}{\cos \alpha + \mu_d \sin \alpha}$$

$$\frac{dT}{d\alpha} = 0$$

$$\textcircled{x} \quad T \cos \alpha - m_d N = 0$$

$$\textcircled{y} \quad N + T \sin \alpha - Mg = 0$$

$$\frac{dT(\alpha)}{d\alpha} = \frac{d}{d\alpha} \left( \frac{\mu_d Mg}{\cos\alpha + \mu_d \sin\alpha} \right) = \mu_d Mg \frac{d}{d\alpha} \left( \frac{1}{\cos\alpha + \mu_d \sin\alpha} \right)$$

~~$$= \mu_d Mg \frac{-\sin\alpha + \mu_d \cos\alpha}{(\cos\alpha + \mu_d \sin\alpha)^2} = 0 \quad \forall \alpha \in [0, \frac{\pi}{2}]$$~~

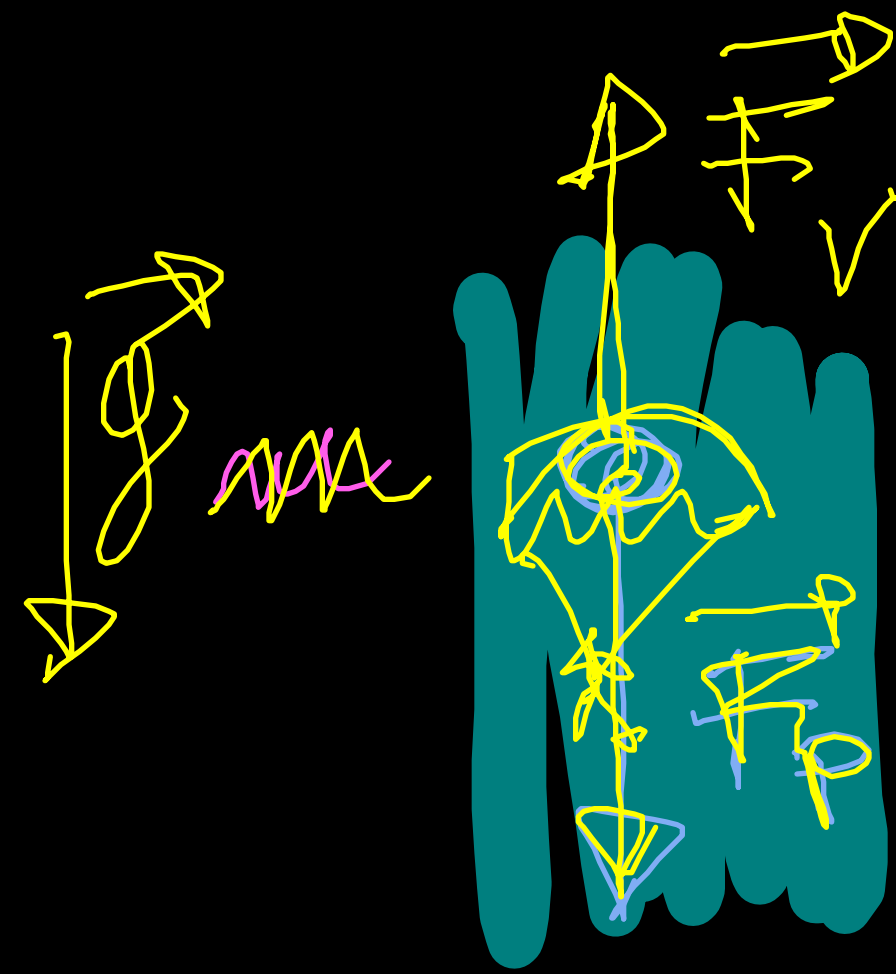
$$-\sin\alpha + \mu_d \cos\alpha = 0 \Rightarrow \tan\alpha = \mu_d$$

$$\alpha_0 = \arctan(\mu_d) \quad \mu_d = 0.63$$

$$\alpha_0 = 32^\circ \quad T(32^\circ) = 235 \text{ N}$$

$$M = 45 \text{ kg}$$

# ATTRITO VISCOSO



$$\vec{F}_v = -b\vec{v}$$

$$-mg + F_v = ma$$

$$-mg + b v = ma$$

$$v = v(t) \quad -mg + b v(t) = m \frac{d v(t)}{dt}$$

$$\frac{dv}{dt} = \frac{b}{m} v - g$$

$$\frac{dv}{dt} - \frac{b}{m} v = 0$$

SOL. GEN.

SOL. PART.

+

SOL. GEN. DELL'OMOG. ASS.