CONSERV. EN. MECC.

$\text{COST.} = E = K + U$ SE SOLO F CONS.

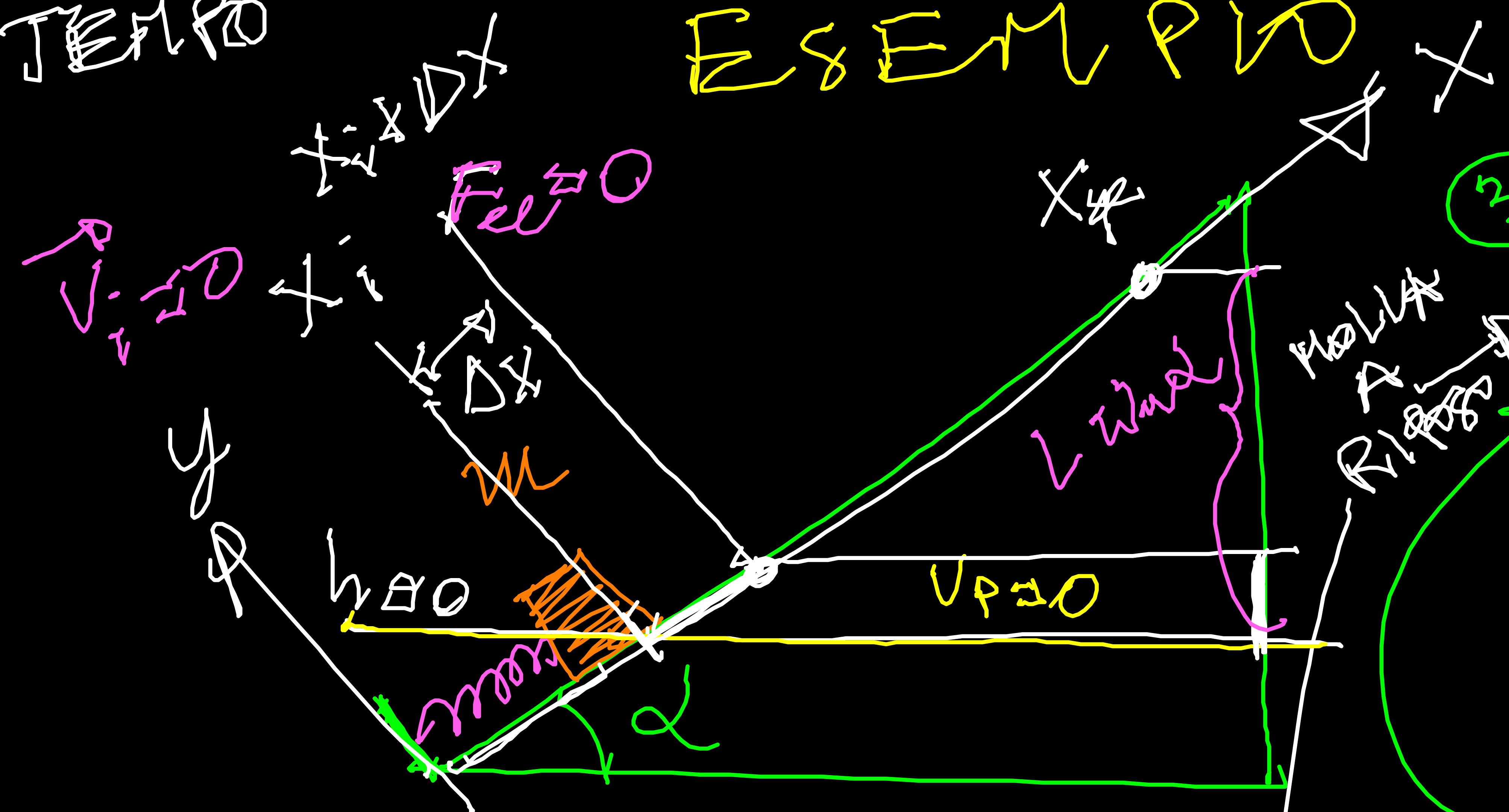
NEL TEMPO

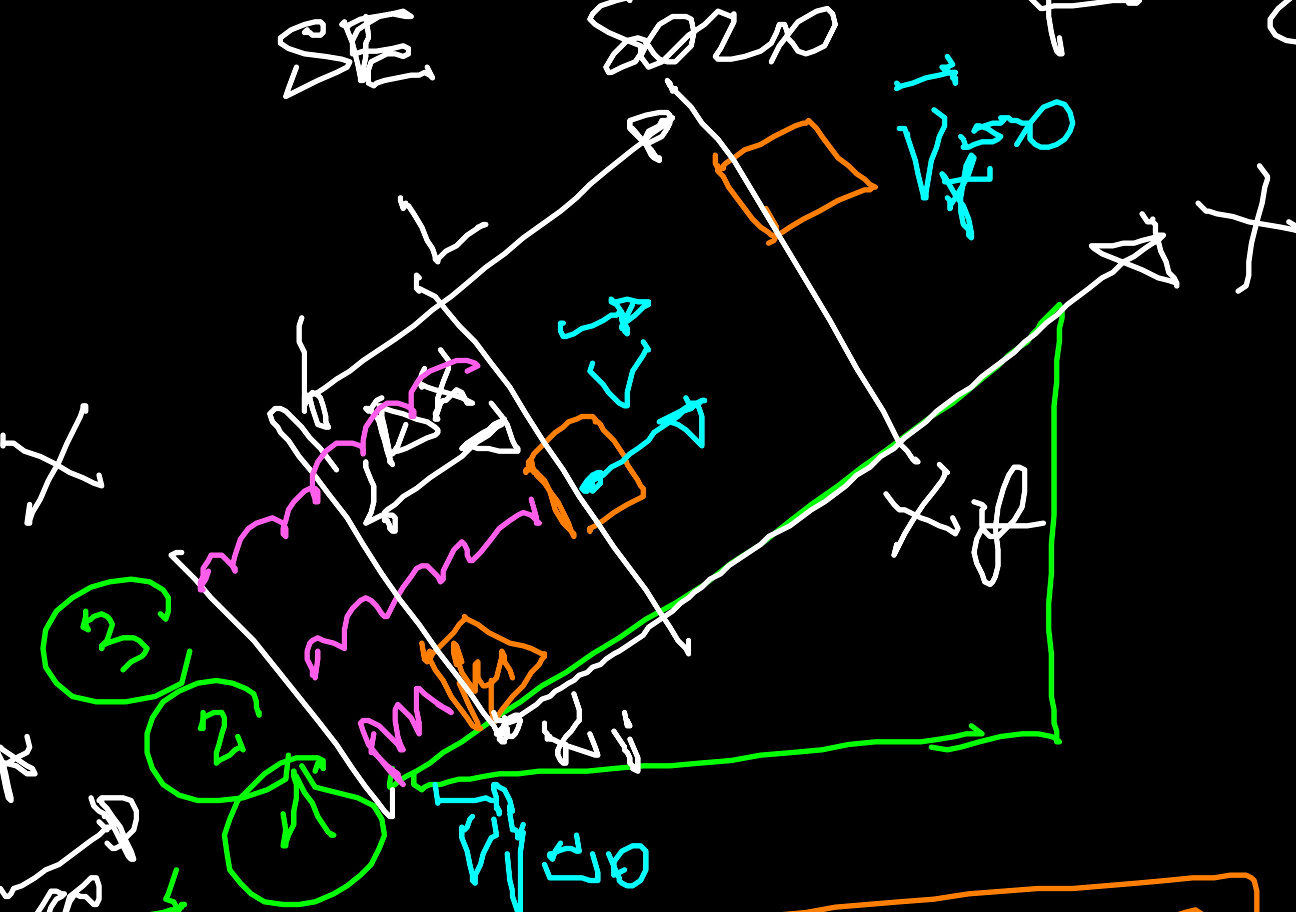
$\vec{F}_p \to \mathcal{L}_p \to U_p$

$\vec{F}_{el} \to \mathcal{L}_{el} \to U_{el}$

$\vec{N} \to \mathcal{L}_N = 0$

ESEMPIO





$$? \quad L = x_f - x_i \quad ?$$

SUPPONENDO NO ATTR.

	x	K	$+ U_p$	$+ U_{el}$	$= E = \text{COST}$
1	x_i	0	0	$\frac{1}{2}k(\Delta x)^2$	$\frac{1}{2}k(\Delta x)^2 =$
2	$x_i + \Delta x$	$\frac{1}{2}mv^2$	$mg(\sin\alpha)\Delta x$	0	$\frac{1}{2}mv^2 + mg\Delta x \sin\alpha =$
3	x_f	0	$mgL\sin\alpha$	0	$mgL\sin\alpha$

in x_i la molla è compressa di Δx

$$mgL\sin\alpha = \frac{1}{2}K(\Delta x)^2 \Rightarrow L = \frac{K(\Delta x)^2}{2g\sin\alpha}$$

$$\frac{1}{2}mv^2 + mg(\Delta x)\sin\alpha = \frac{1}{2}K(\Delta x)^2$$

$$v = \sqrt{-2g(\Delta x)\sin\alpha + \underbrace{\frac{K}{m}(\Delta x)^2}}$$

$$\frac{K}{m}(\Delta x)^2 \geq 2g(\Delta x)\sin\alpha$$

PARTO DAL TEOREMA DELL'EN. CINETICA

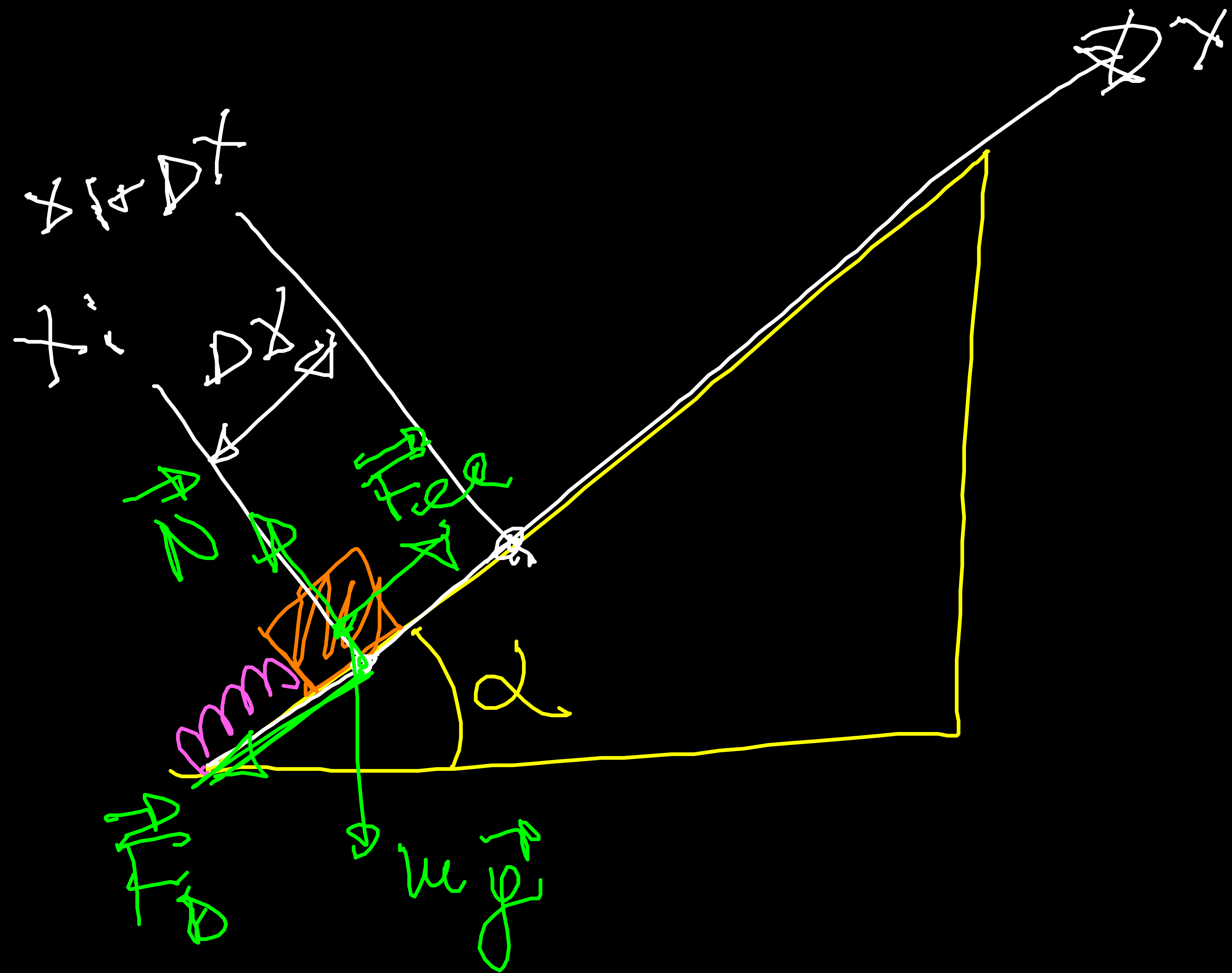
$$\Delta K = \mathcal{L}_{TOT} = \mathcal{L}_C + \mathcal{L}_{NC} = -(U_f - U_i) + \mathcal{L}_{NC}$$

$$K_f - K_i = -U_f + U_i + \mathcal{L}_{NC}$$

$$\underbrace{K_f + U_f}_{E_{m,f}} = \underbrace{K_i + U_i}_{E_{m,i}} + \mathcal{L}_{NC}$$

$$\boxed{E_{m,f} - E_{m,i} = \mathcal{L}_{NC}}$$

Se $\mathcal{L}_{NC} = 0 \Rightarrow E_{m,f} = E_{m,i}$



$x + \Delta x$
x
Δx
Δx
$\vec{N}$
$\vec{F}_{el}$
α
$\vec{F}_D$
$m\vec{g}$