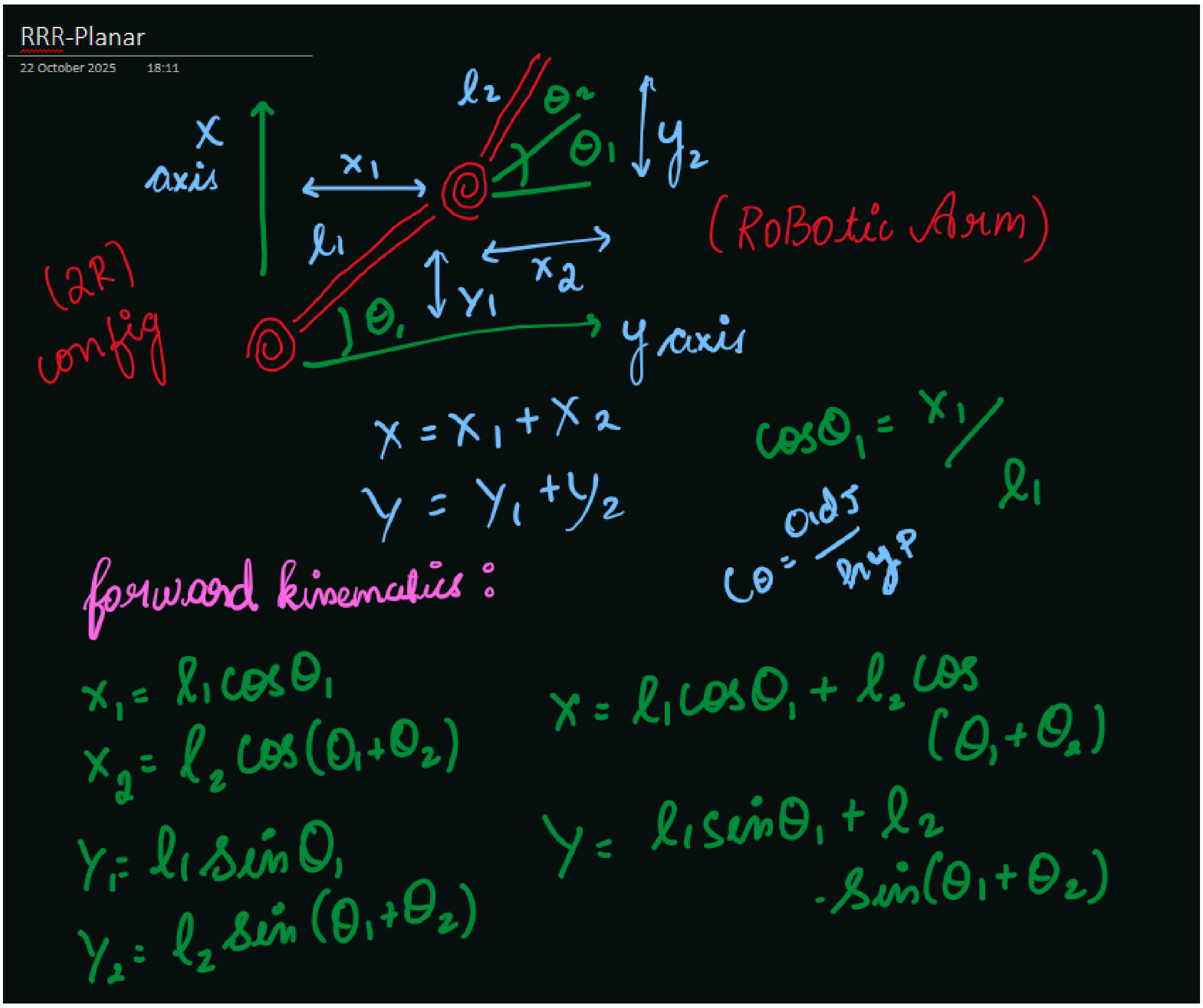
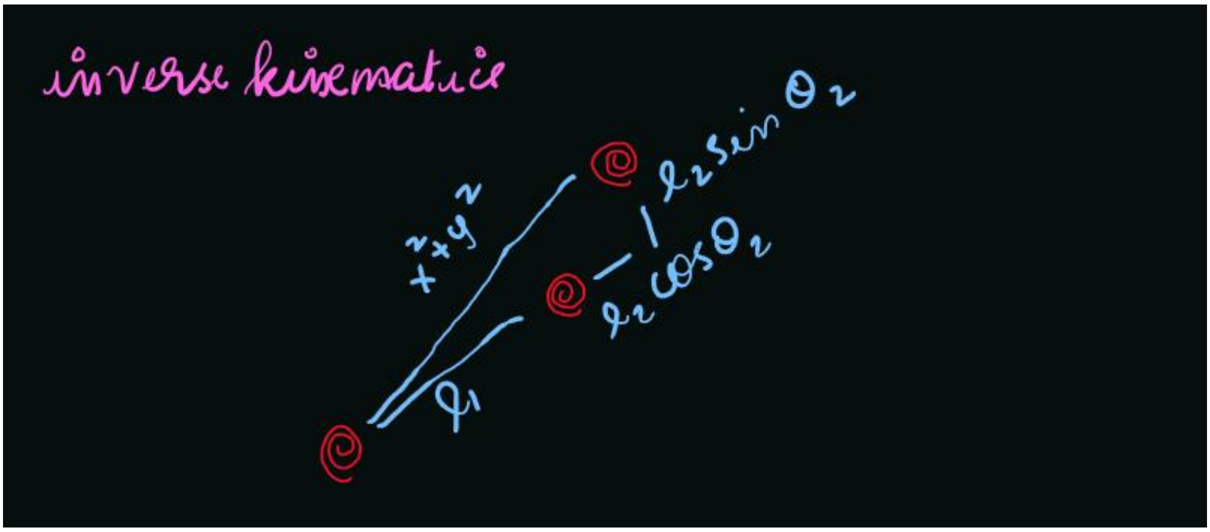
RRR-Derivation :



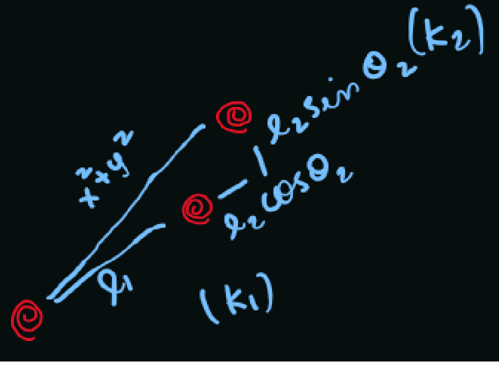


$$x^2+y^2 = (l_2 \sin\theta_2)^2 + (l_1 + l_2 \cos\theta_2)^2$$

$$x^2+y^2 = l_2^2 \sin^2\theta_2 + l_1^2 + l_2^2 \cos^2\theta_2 + l_1 l_2 \cos\theta_2 (2)$$

$$x^2+y^2 = l_2^2 (1) + l_1^2 + l_1 l_2 \cos\theta_2$$

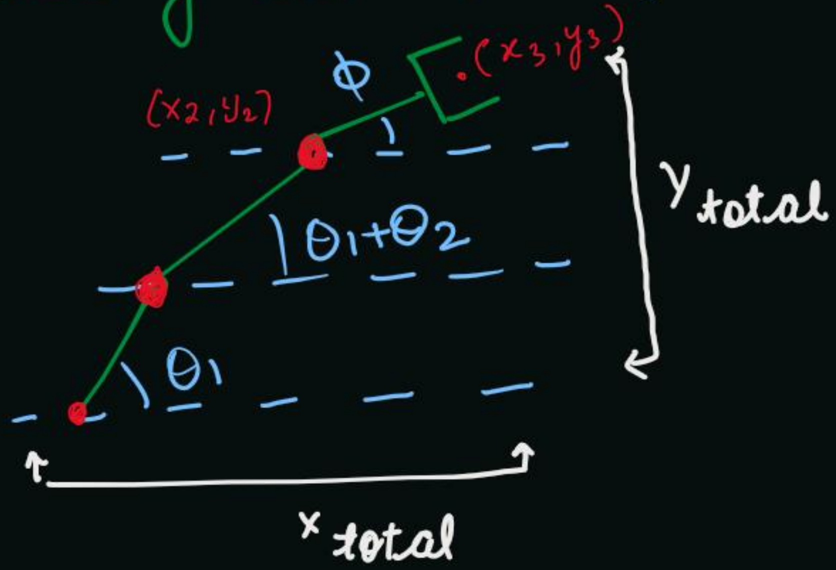
$$\theta_2 = \left(\frac{x^2+y^2-l_1^2-l_2^2}{2 l_2 l_1} \right) \cos^{-1}$$



$\theta_1 \Rightarrow$

$$\tan(y/x) - \tan\left(\frac{k_2}{k_1}\right)$$

in case of 3R: $(\phi = \Sigma\theta)$



So $y - l_3 \sin\phi = Y_2$

$x - l_3 \cos\phi = X_2$

after X_2, Y_2 its similar as 2R configuration } X, Y in 2R is now (X_2, Y_2)

for 3R we give (x, y, ϕ)

and get (T_1, T_2, T_3)

Making angles absolute :

$MT_1 \rightarrow$ its absolute angle

$MT_2 \rightarrow$ its $90 + t_1 + t_2$

but Motor is already in 90 so its $90 + \theta_1 + \theta_2$

$MT_3 \rightarrow$ its relative to t_2

$\Rightarrow 90 + T_3$