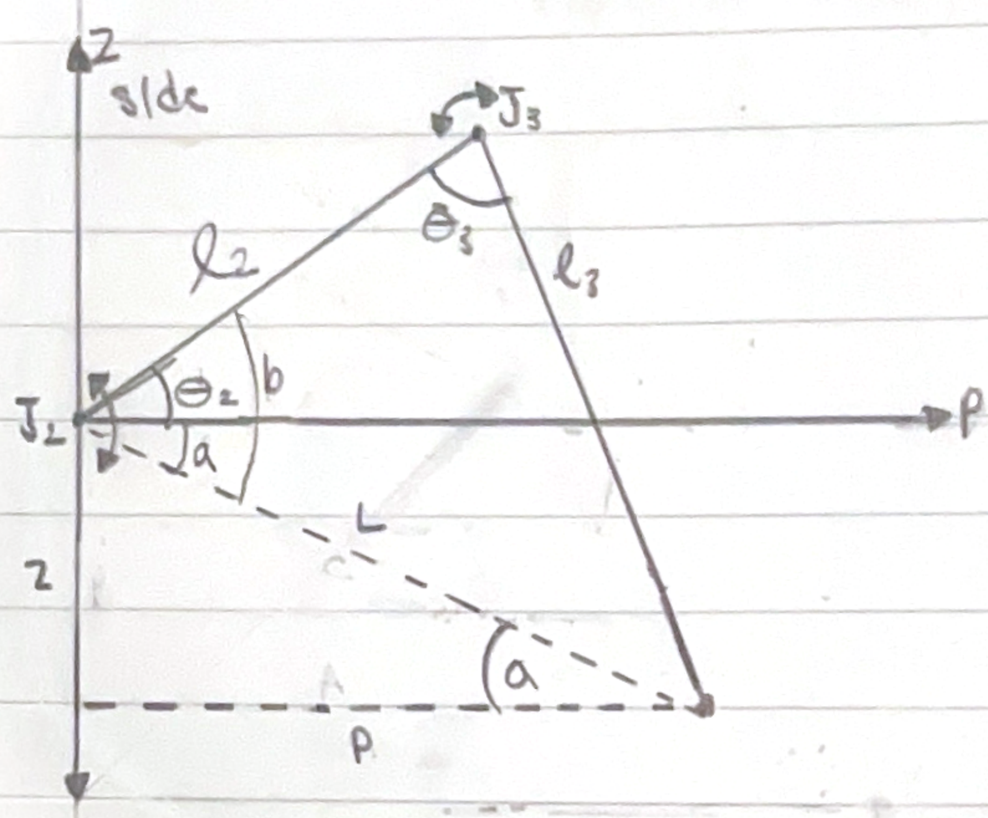
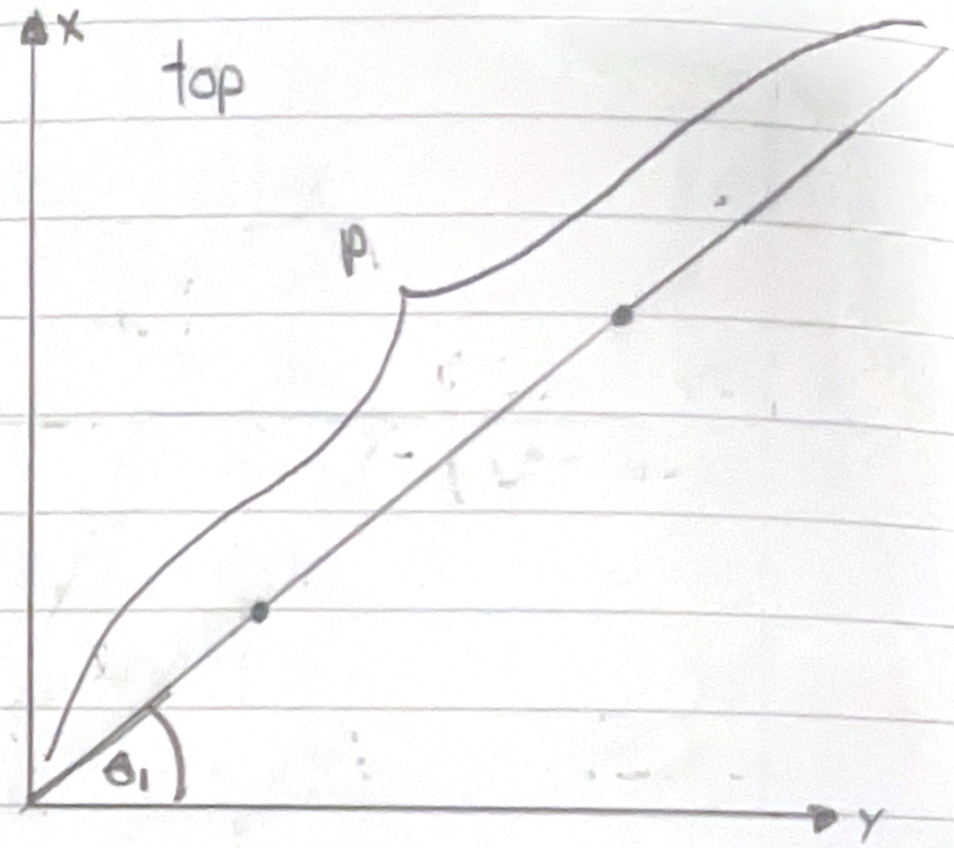
Hexapod Inverse Kin





$$L = \sqrt{P^2 + Z^2}$$

$$\theta_3 = \cos^{-1}\left(\frac{A^2 + B^2 - C^2}{2AB}\right) \rightarrow \theta_3 = \cos^{-1}\left(\frac{l_2^2 + l_3^2 - L^2}{2 l_2 l_3}\right)$$

$$b = \cos^{-1}\left(\frac{L^2 + l_2^2 - l_3^2}{2 L l_2}\right) \qquad a = \tan^{-1}\left(\frac{Z}{P}\right)$$

$$\theta_2 = b - a$$

$$P = \sqrt{x^2 + y^2}$$

$$\theta_1 = \tan^{-1}\left(\frac{x}{y}\right)$$

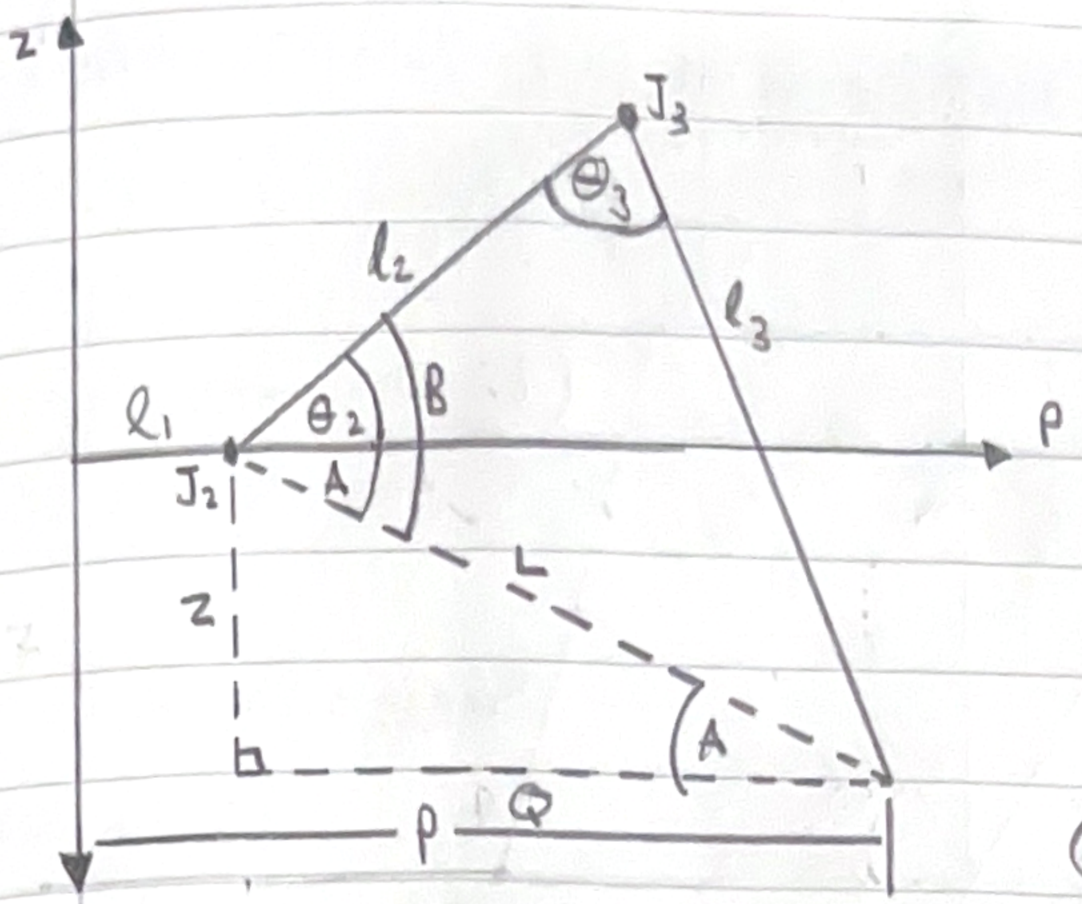
$$\theta_{3_s} = b + (-a)$$

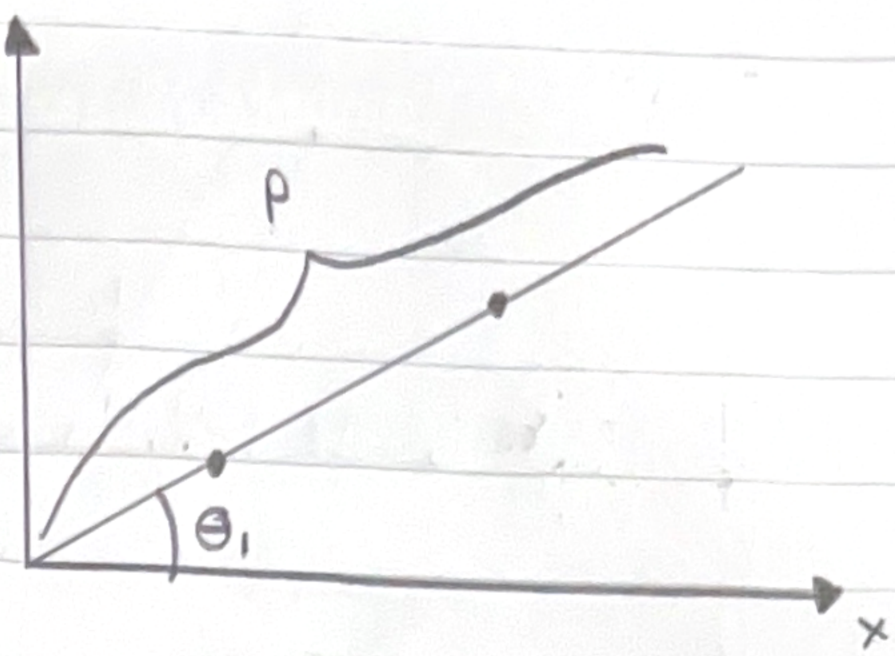
$$\theta_{3_s} = \theta_3 + J_{3OFF} - 90°$$

$l_1 = 36.5\,mm$ $\quad J_{3_{OFF}} = 15°$

$l_2 = 100\,mm$ $\quad Y_{OFF} = 144.477$

$l_3 = 186.35\,mm$ $\quad Z_{OFF} = 109.244\,mm$





$$P = \sqrt{x^2 + y^2}$$

$$Q = P - L_1$$

$$L = \sqrt{Q^2 + z^2}$$

$$\theta_3 = \cos^{-1}\left(\frac{l_2^2 + l_3^2 - L^2}{2 l_2 l_3}\right)$$

$$a = \tan^{-1}\left(\frac{z}{Q}\right)$$

$$b = \cos^{-1}\left(\frac{L^2 + l_2^2 - l_3^2}{2 L l_2}\right)$$

$$\theta_2 = B - A$$

$$\theta_1 = \tan^{-1}\left(\frac{y}{x}\right), \quad \theta_{2_S} = B + (-A), \quad \theta_{3_S} = \theta_3 + J_{3OFF}$$

$l_1 = 36.5mm$

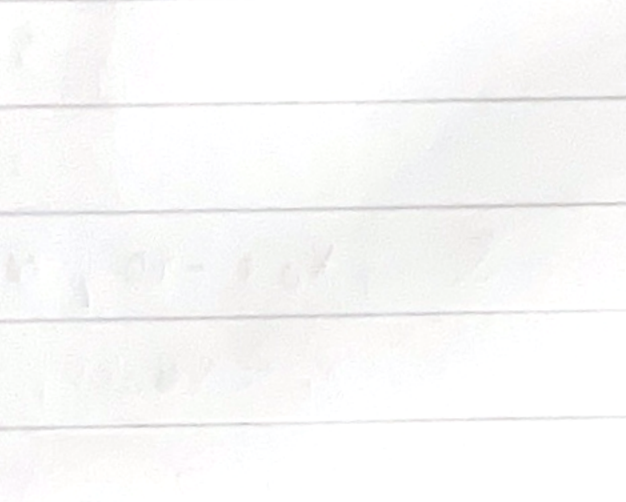
$l_2 = 100mm$

$l_3 = 186.35mm$

$\theta_{3_{OFF}} = 15°$

$Y_{OFF} = 144.477mm$

$Z_{OFF} = 109.244mm$



WORLD OFFSETS: (x, y)

1: (216.722, 119.98) 4: (-216.722, -119.98)

2: (0, 240.677) 5: (0, -240.677)

3: (-216.722, 119.98) 6: (-216.722, -119.98)