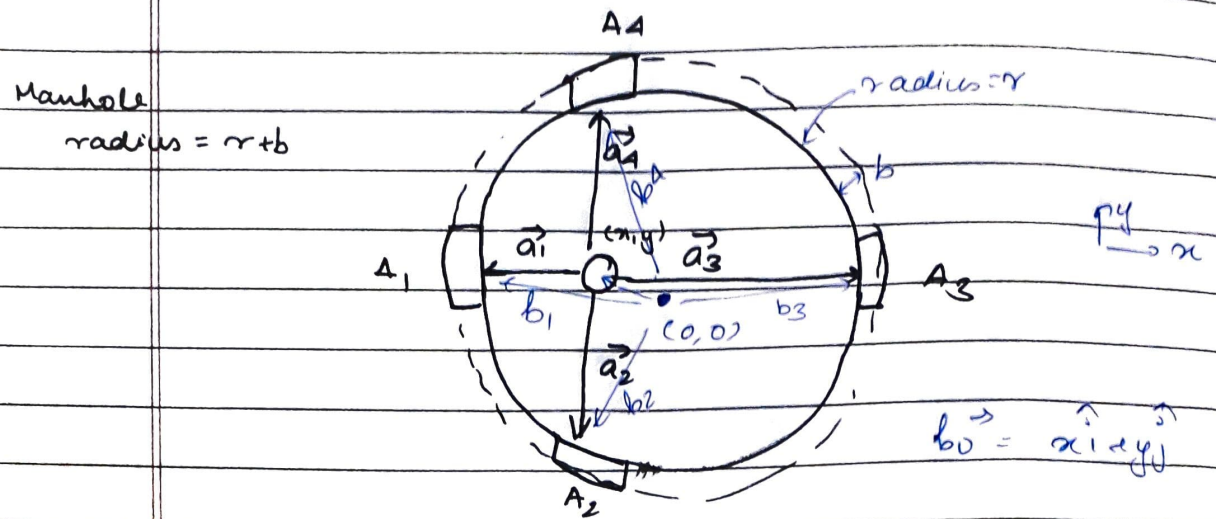
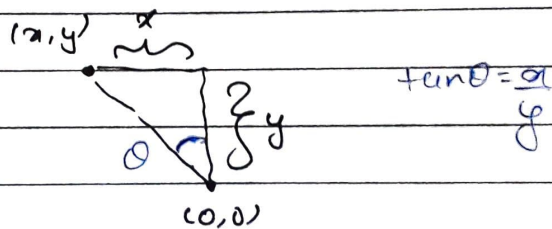


Let A_1, A_2, A_3, A_4 be arms of jack



When the end-point comes within the circle of radius $R = r$:

let end point = (x, y)



$$\Rightarrow A_1 = (r+x) \begin{pmatrix} -1 \\ 1 \end{pmatrix} = \vec{a}_1$$

$$A_3 = (r-x) \begin{pmatrix} 1 \\ 1 \end{pmatrix} = \vec{a}_3$$

$$A_2 = (r+y) \begin{pmatrix} -1 \\ -1 \end{pmatrix} = \vec{a}_2$$

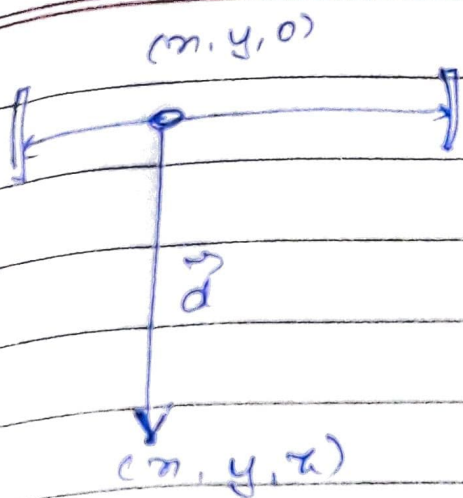
$$A_4 = (r-y) \begin{pmatrix} 1 \\ -1 \end{pmatrix} = \vec{a}_4$$

$$b_1 = \vec{a}_1 + \vec{b}_0 = -r\hat{i} + y\hat{j}$$

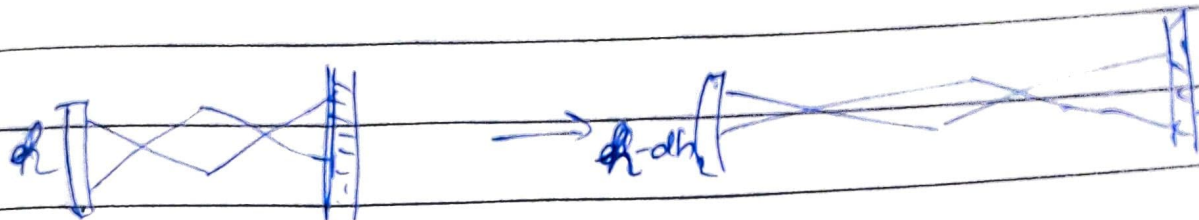
$$b_2 = \vec{a}_2 + \vec{b}_0 = -r\hat{j} + x\hat{i}$$

$$b_3 = \vec{a}_3 + \vec{b}_0 = r\hat{i} + y\hat{j}$$

$$b_4 = \vec{a}_4 + \vec{b}_0 = r\hat{j} + x\hat{i}$$



With increase in radius, there would be a slight height shift.



$$\text{let } dh \propto \frac{1}{r} \Rightarrow dh = \frac{R}{r}$$



$$\therefore \vec{d} = (z - dh)(-\hat{k})$$

$$= \left(z - \frac{R}{r}\right)(-\hat{k})$$

If end point comes outside circle with radius r ;

length of adjustment
to be made

$$= \sqrt{x^2 + y^2} - r$$

↑
If end object