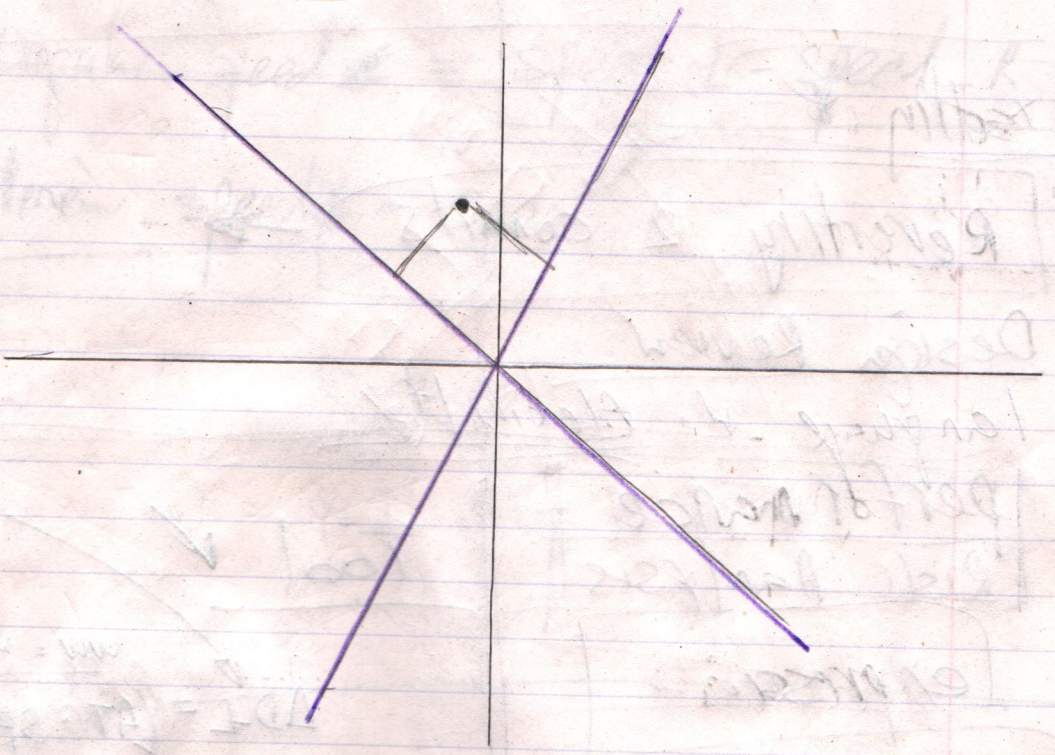
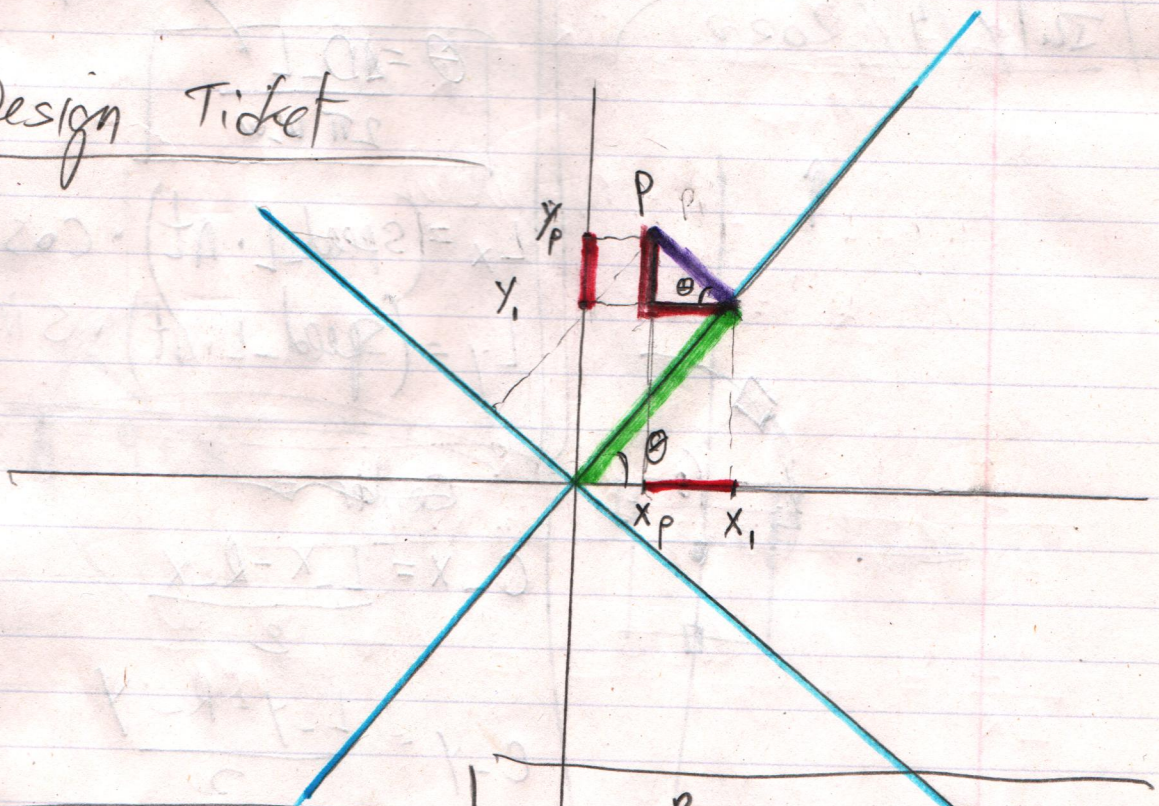
Rotation Matrix



Design Ticket

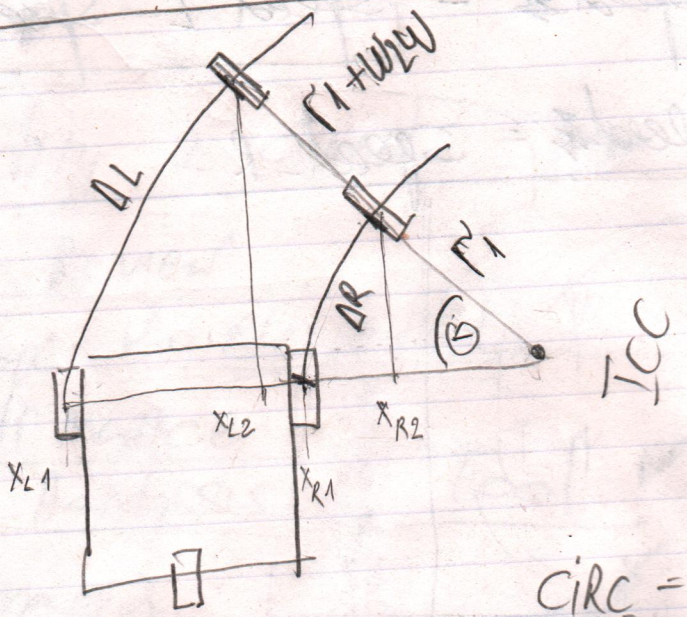


$$y_p - y_1 = {}^{B}P_y \cdot \sin\theta$$
$$y_1 = {}^{B}P_x \cdot \sin\theta$$

$$x_1 = {}^{B}P_x \cdot \cos\theta$$
$$x_1 - x_p = {}^{B}P_y \cdot \cos\theta$$

Differential Drive Robot

W2W = distance between wheels



CIRC = circumference of the arc (360°)

$$\theta = \frac{\Delta L}{circ\_L} = \frac{\Delta R}{circ\_R}$$

$$circ\_L = 2\pi \cdot (r_1 + W2W)$$

$$circ\_R = 2\pi \cdot r1$$

$$\frac{\Delta L}{2\pi (r_1 + W2W)} = \frac{\Delta R}{2\pi \cdot r1}$$

$$\frac{\Delta L}{\Delta R} = \frac{r_1 + W2W}{r1} = 1 + \frac{W2W}{r1}$$

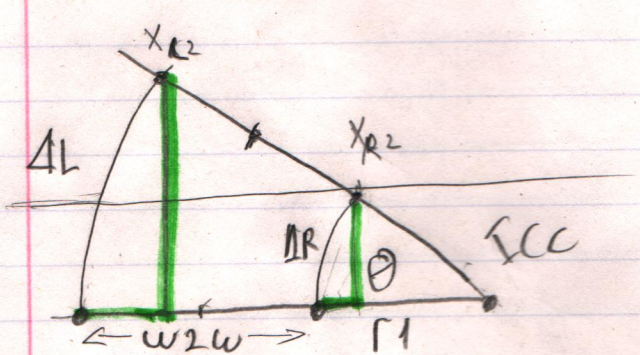
$$\frac{\Delta L}{\Delta R} - 1 = \frac{W2W}{r1}$$

* issue when $\Delta R = 0$

$$\frac{\Delta L - \Delta R}{\Delta R} = \frac{W2W}{r1}$$

$$\frac{r1}{W2W} = \frac{\Delta R}{\Delta L - \Delta R}$$

$$r1 = \frac{\Delta R}{\Delta L - \Delta R} \cdot W2W \qquad \text{I}$$



$$\theta = \frac{\Delta R}{circum1} = \frac{\Delta R}{2\pi \cdot r1} = \Delta R \cdot \frac{\Delta L - \Delta R}{2\pi \cdot \Delta R \cdot W2W} \cdot 2\pi$$

$$\frac{\Delta L - \Delta R}{W2W} \qquad \text{II}$$

III

$$X_{R2} = X_{R1} + (r_1 - r_1 \cdot \cos\theta)$$

$$Y_{R2} = X_{R1} + (r_1 \cdot \sin\theta)$$

$$X_{L2} = (W2W + r1) - (W2W + r1) \cdot \cos\theta$$

$$Y_{L2} = Y_{L1} + (r_1 + W_2W) \cdot \sin\theta$$