

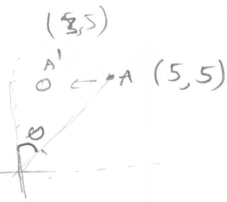
The first diagram shows a right-angled triangle with a vertical side, a horizontal base, and a hypotenuse. A small cross is at the vertex where the base and vertical side meet. The second diagram shows a trapezoid with a horizontal top edge, a horizontal bottom edge, and two slanted sides. A vertical dashed line extends from the top-right corner to the bottom edge.

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(Labeled)

Maintaining

Moving in 1 axis by rotation while keeping the other constant:



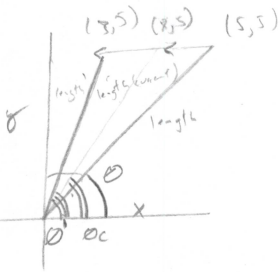
start
current coords: (5, 5)
target coords: (3, 5)
coordinates: (-2, 0)

length at any given point, given known θ ,
last length (if any)

to find: the target length of arm at any given ~~point~~ instant ~~between~~ between the
start coordinate and end coordinate, given the angle from origin, ~~initial length of the arm,~~
initial length of the arm, ~~and the target~~ given the initial angle from origin,
target angle from origin, current angle from origin, initial length of the arm, target length of the arm

To keep in mind:

PID control loops,
fixing errors over the course of the move,
making it work for both coords at once.



$$\text{length} = \sqrt{x^2 + y^2}$$

finding y from current length & angle from origin:

$$y = \text{length} \cdot \sin(\theta_{\text{current}})$$

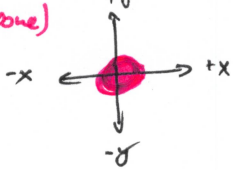
Relative Control:

assuming the operator corrects mistakes:
this assumes ~~assuming~~ that the bot's operator can see the arm ^{can} make corrections,

Joystick:

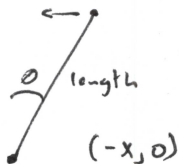
Robot arm only moves when joysticks are out of deadzone:

(Deadzone)



Determine rate of movement (at center) by
multiply

$$\text{speed} = \text{length of robot arm} \cdot \text{joystick analog reading outside of deadzone} \cdot \text{constant that makes the power 1}$$



$$\text{rate} = \text{len}$$

$$\text{speed} = \text{length} \cdot \text{joystick}$$