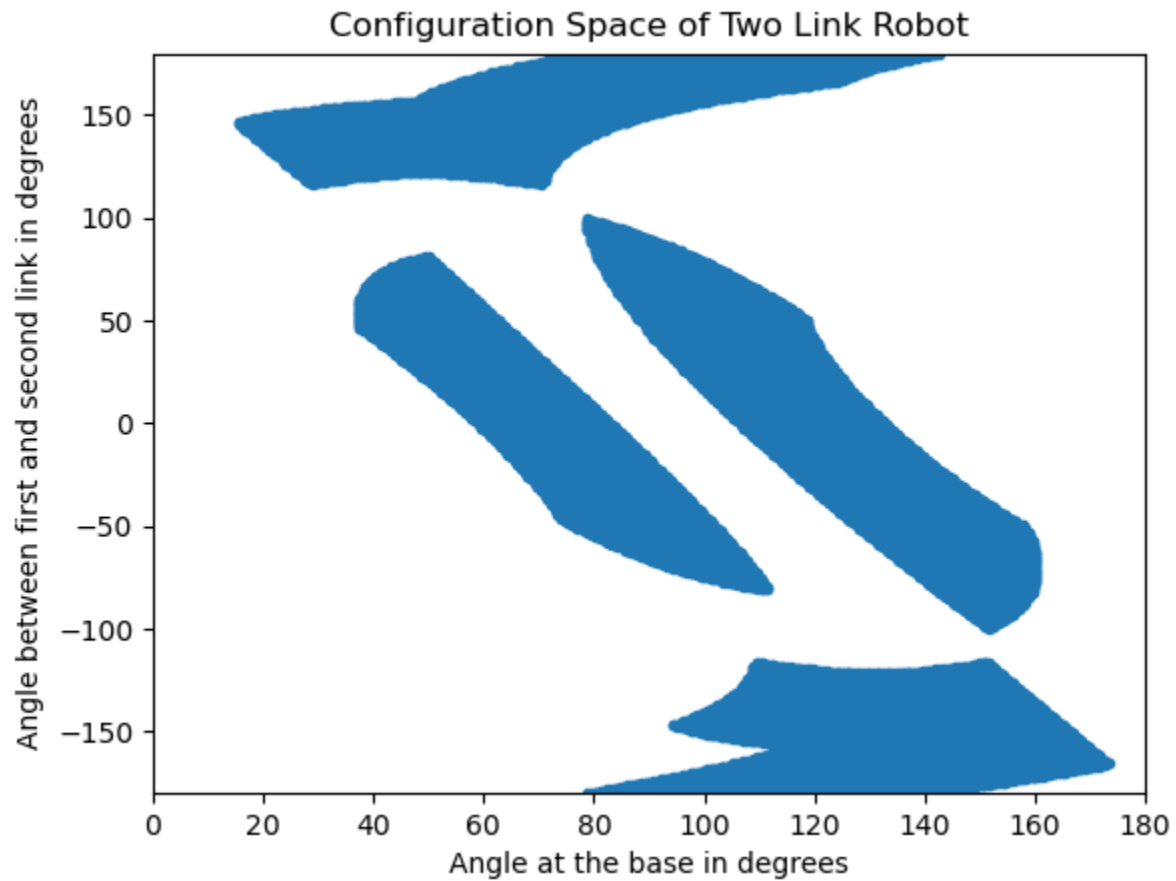


Arm Lab-Group 13

- 1.1.1 I would place the motor so that it rotates near each joint. The first motor could be placed anywhere. The second one would be placed along the 3.75 inch link. The motor would be attached to each joint with gears, so we can adjust the gear ratio. In addition, if the third dimension is considered, positioning the motors above the arm will prevent the motors from hitting the obstacles.
- 1.1.2 A high gear ratio is better than a low one, because speed is not as important as the torque in order to control the arms with accuracy. We would want a higher gear ratio at the first joint because more of the arm is cantilevered off of that point. The second joint should also have a high gear ratio, but it can be less than the first joint.
- 1.1.3 Sturdiness and precision would be important when making a robotic arm. We would need the robot to be sturdy and the links to be rigid so that the arm doesn't shake as it moves. Less sturdiness could lead the robot to perform in unpredictable ways. The robot must also be precise because it must be able to know where it is accurately to be able to know where to go.

2.1

Figure 1 Configuration space for Arm Lab robot. Please note that all angles are with respect to the robot. The blue zones are where the end of the robot cannot go. The obstacles were bloated by a radius of 0.25in



Joint limit for base angle is $0 \leq \text{base_angle} \leq 180$ degrees and the middle joint angle is constrained by $-180 \leq \text{mid_angle} \leq 180$.