Day 11

Issues with Cartesian-Space Paths

- consider the RR robot shown below
- assume that the second joint can rotate by ±180 degrees



what happens when it is commanded to follow the straight line path shown in red?







jump discontinuity in first derivative = infinite rotational acceleration steep slope = high rotational velocity

- the reachable workspace of a robot is the volume swept by the end effector for all possible combinations of joint variables
 - i.e., it is the set of all points that the end effector can be moved to

- consider the RR robot shown below
- assume both joints can rotate by 360 degrees



rotating the second joint through 360 degrees sweeps out the set of points on the dashed circle



rotating the first and second joints through 360 degrees sweeps out the set of all points inside the outer dashed circle



workspace consists of all of the points inside the gray circle



workspace consists of all of the points inside the gray circle



- consider the RR robot shown below where the second link is shorter than the first
- assume both joints can rotate by 360 degrees



rotating the second joint through 360 degrees sweeps out the set of points on the dashed circle



workspace consists of all of the points inside the gray area



- consider the following straight line path shown in red
- start point, end point, and all points in between are reachable



- consider the following straight line path shown in red
- start point and end point are reachable, but some points in between are not reachable

