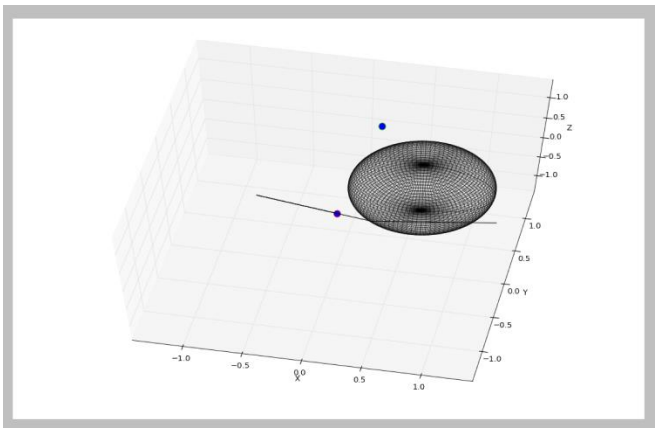
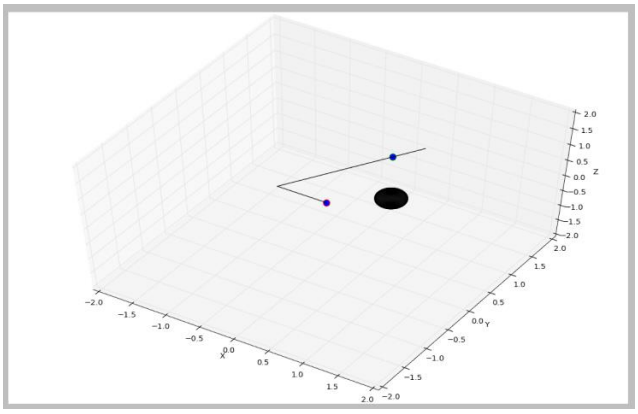
Solution 5:

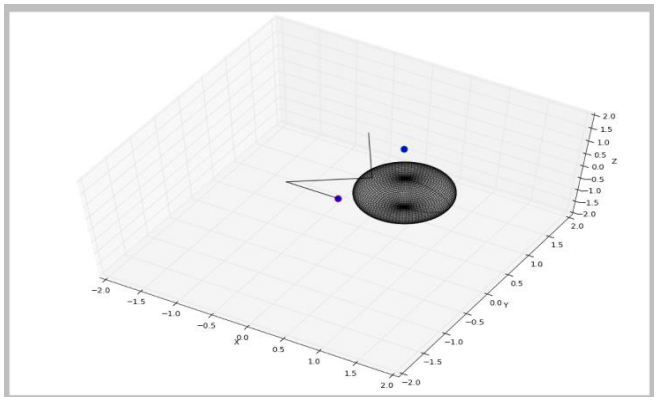
When we change the initial configuration space the algorithm may not find a solution even when the constraints are met as the optimization may return a local minimum. Consider the following cases

For the cases of qo=[pi, pi/2 ,pi] and r=0.6 all the constraints are satisfied yet there is not a solution.



For the case of q=[pi, -pi/2,(3/4)pi] and r=0.2 there is a solution





For the same configuration q=[pi, -pi/2,(3/4)pi] but r=0.6 there is a collision

Thus, as we start increasing the radius the configuration space of obstacle (Q obstacle) increases and free configuration space(Q free) decrease and chances of a collision free path decreases.