

SC627 Assignment 4

Robotic Networks in Balancing

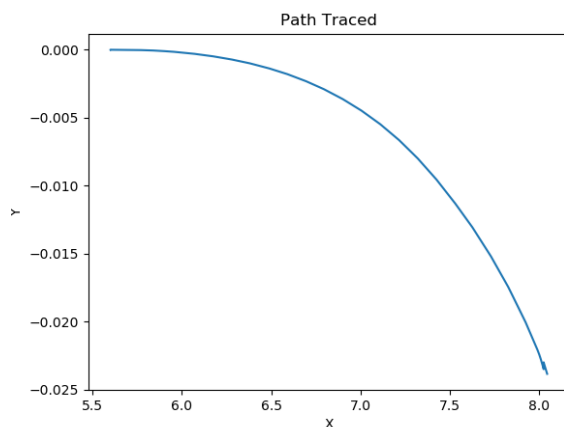
A balancing position has to be reached where all the robots are required to settle at an equidistant position from each other. For simplicity, I have used a P-controller for it. We will compute our current robot distance from the left and right robots. If that distance is equal, then the bot will stop else it will keep moving until it reaches the equidistant condition. I have chosen the K_p value = 1.2 which works perfectly and all robots are able to reach the required condition fastly.

Equation involved:

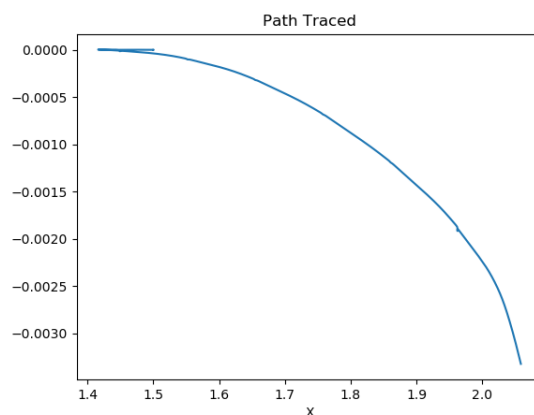
$$u = \text{dist}(\text{curr_robot_pos}, \text{right_robot_pos}) - \text{dist}(\text{curr_robot_pos}, \text{left_robot_pos})$$

Based on the value of u , we will decide the velocity of our current robot. All the intermediate robots will start moving simultaneously to reach the equilibrium condition.

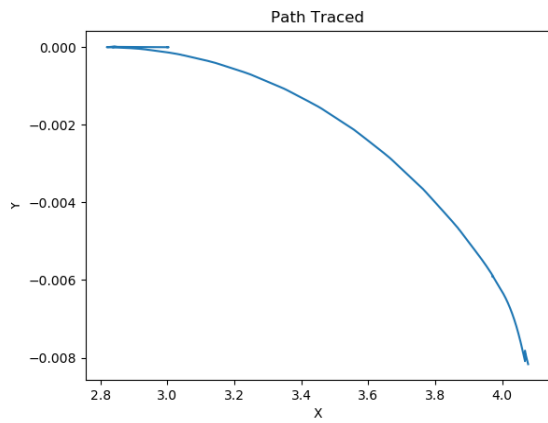
Here's the path that each bot has traced:



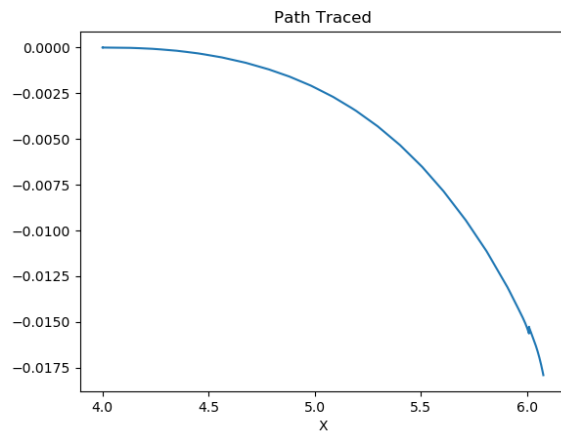
Robot 2



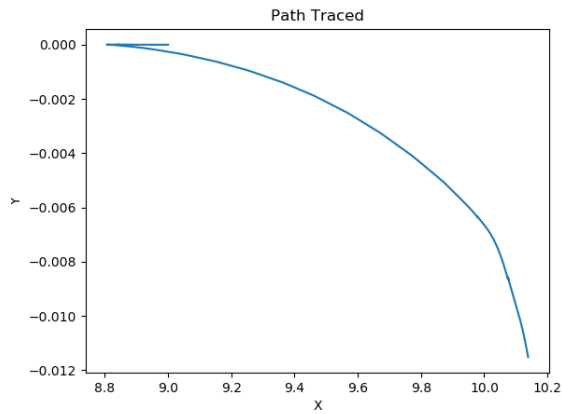
Robot 3



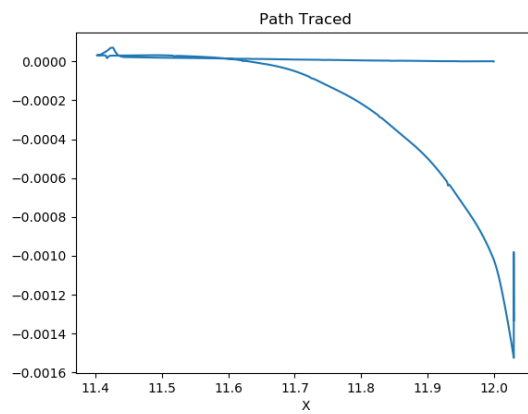
Robot 4



Robot 5

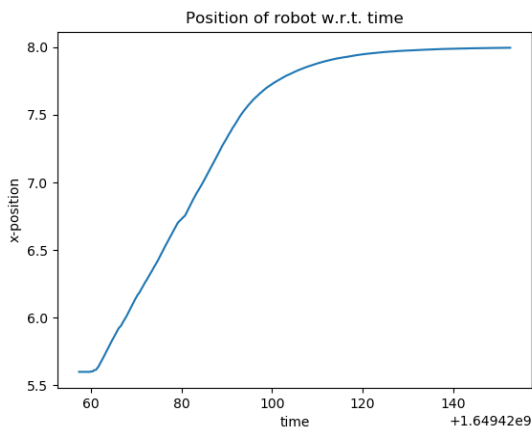


Robot 6

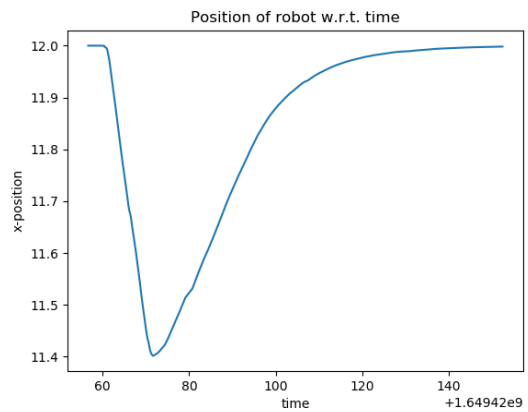


Robot 7

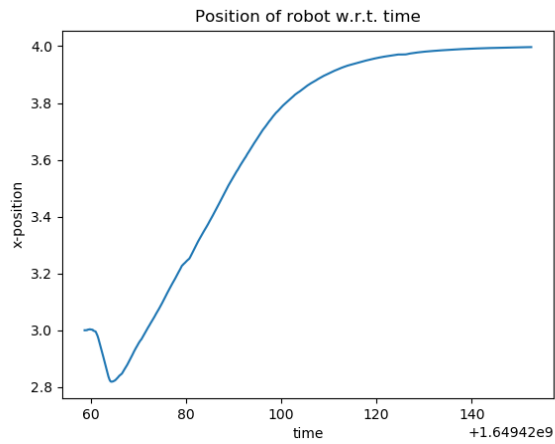
Here's the respective time vs path traced plot:



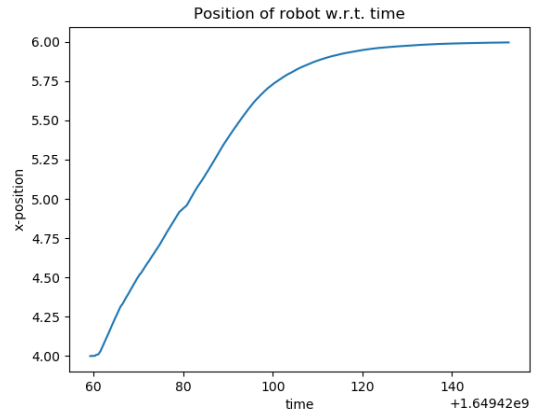
Robot 2



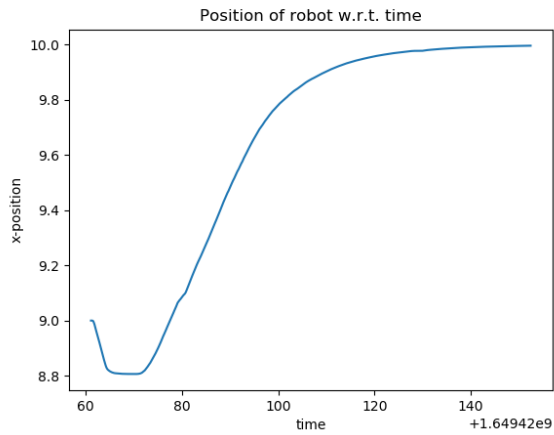
Robot 3



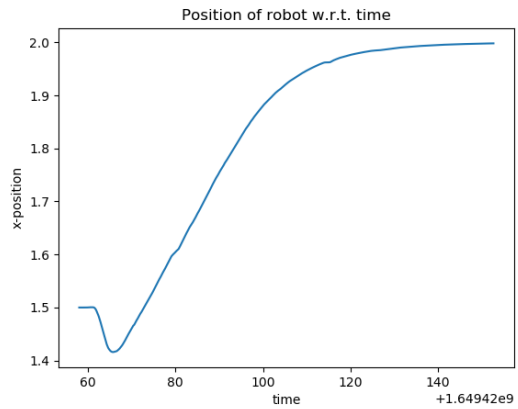
Robot 4



Robot 5



Robot 6



Robot 7

Thus, all robots are able to reach a common consensus.

-Dikshant
180040033