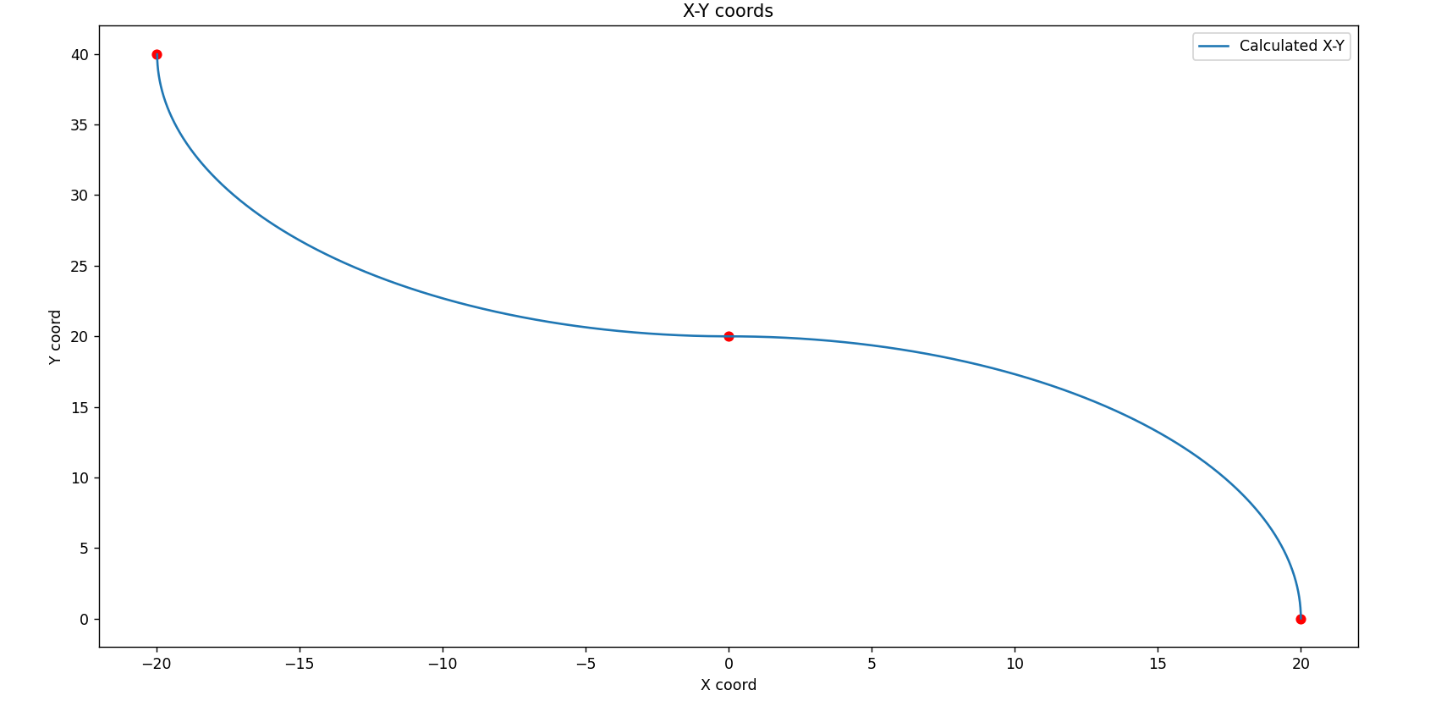


Autonomous Mobile Robotics

HW3

Walid Shaker

**Path Planning:**

The trajectory is defined using two circles as shown below. The code is attached.

Point B (starting point) is selected as (-20, 40)

Point A (final point) is (20,0)

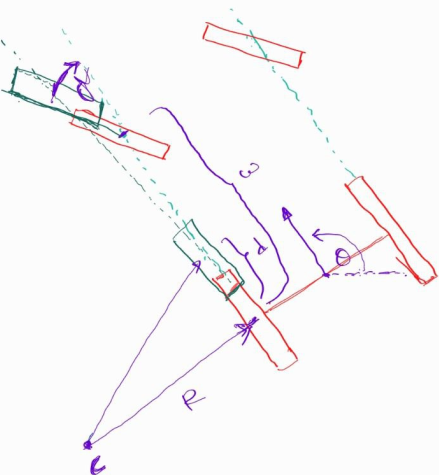
Point C (midpoint) is (0,20)

Since , so if we set , then

The simulation time from B to C (

So, the total time () that the vehicle takes from B to A is

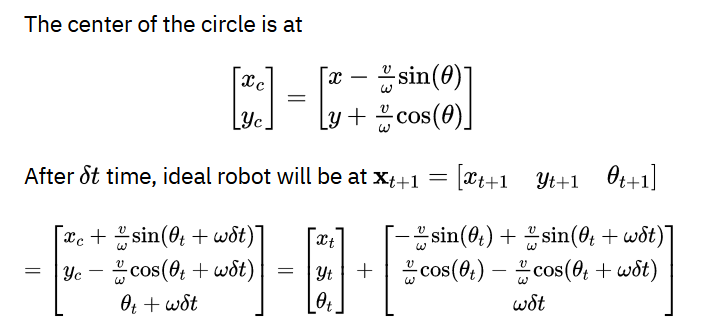
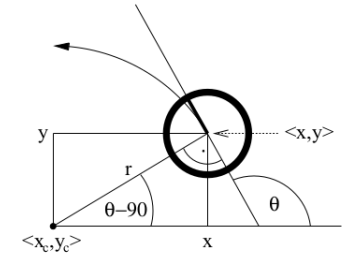
Let the sampling time , so the number of iterations to reach final point

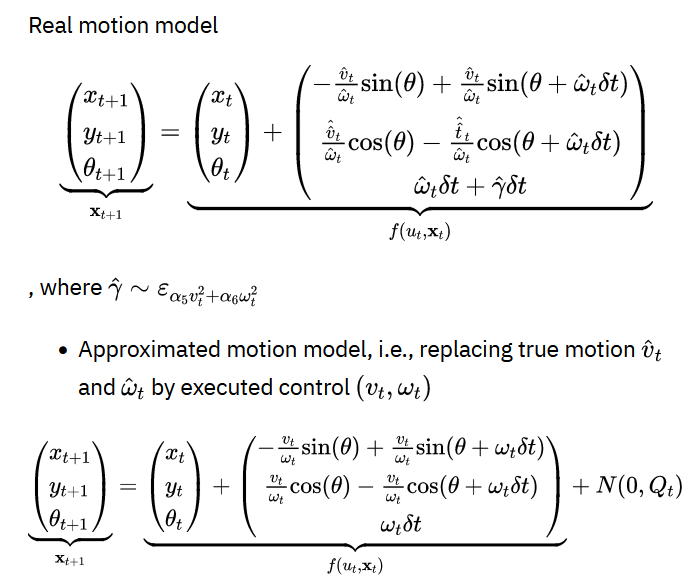
**Motion Model: kinematics**

I used the same bicycle model explained in the lecture.

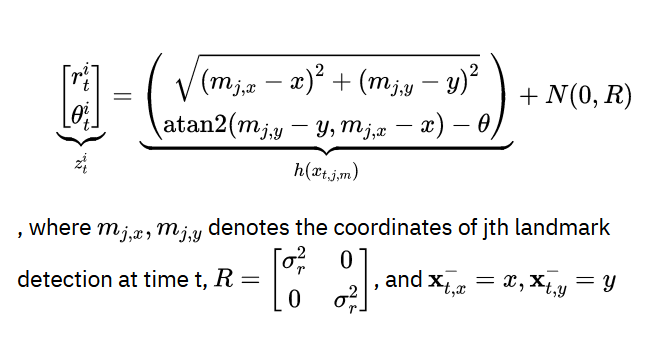
Robot pose

A robot can be control through linear and angular velocities

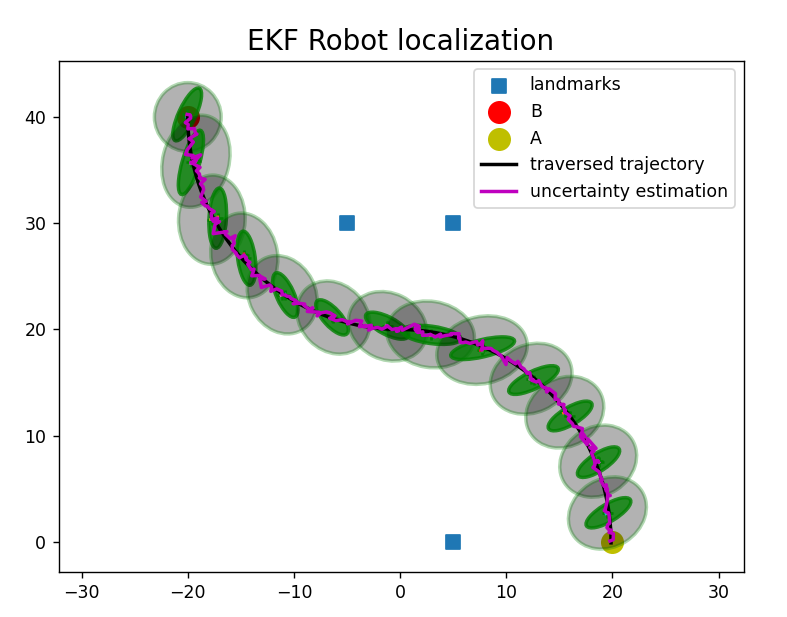




**Sensor Model: correction step**



**EKF:**

Extended Kalman filter localization is implemented, and the robot position uncertainty estimation and the traversed trajectory are plotted over the time as shown below.