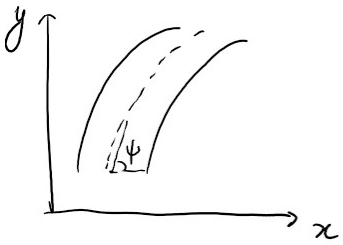
Vehicle Dynamics and Test Track Information

1. Simplified Vehicle Dynamics Model



$$\dot{x} = v\cos\psi$$
$$\dot{y} = v\sin\psi$$
$$\dot{\psi} = \frac{v}{L}\cdot\delta$$
$$\dot{v} = a$$

$\delta \in [-25^\circ, 25^\circ]$
$a \in [-1, 1]$
$L = 3$

2. Sampling Rate, MPC Horizon and Update Time

$\Delta t = 0.01\,s.$

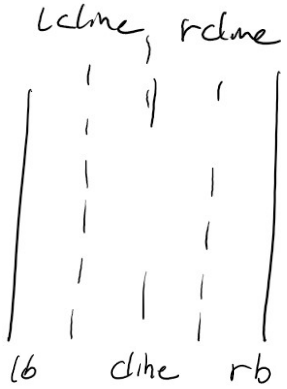
$t_u = 0.1\,s.$

$t_c > 2\,s$

3. Test Cases

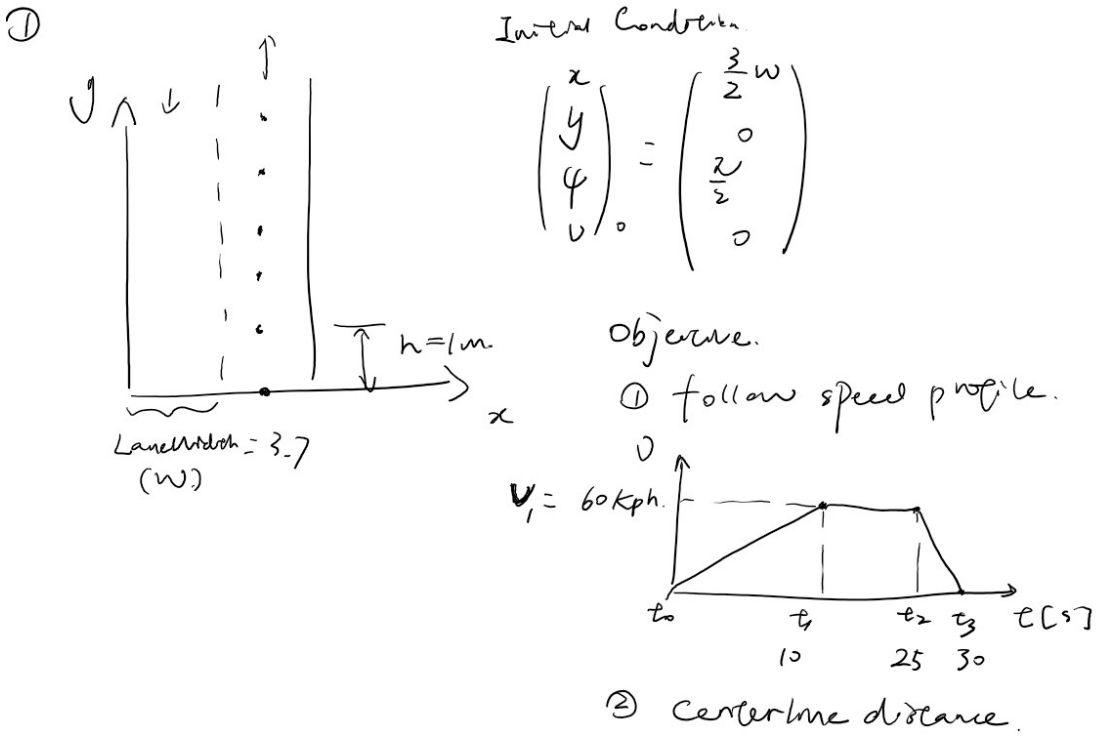
There are 5 lane marks and 1 angle associated with each TestTrack except for Double Lane Change (DLC).

5 lane marks: lb, lcline, cline, rcline, rb each having *x*, *y* coordinates.

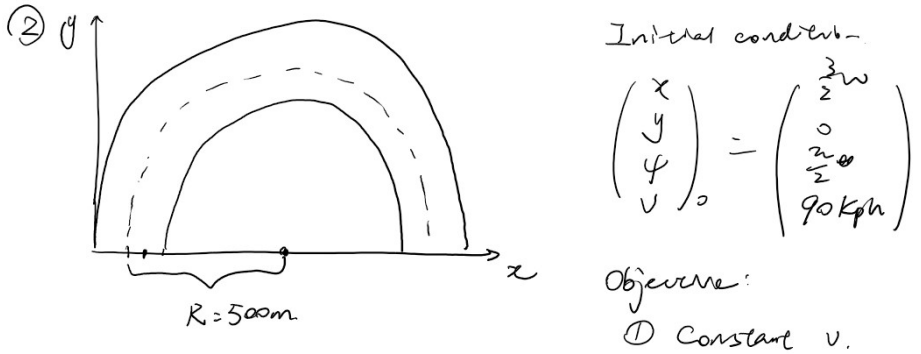


The information has been saved in TestTrack#.csv file, the first line of the file describes the information.

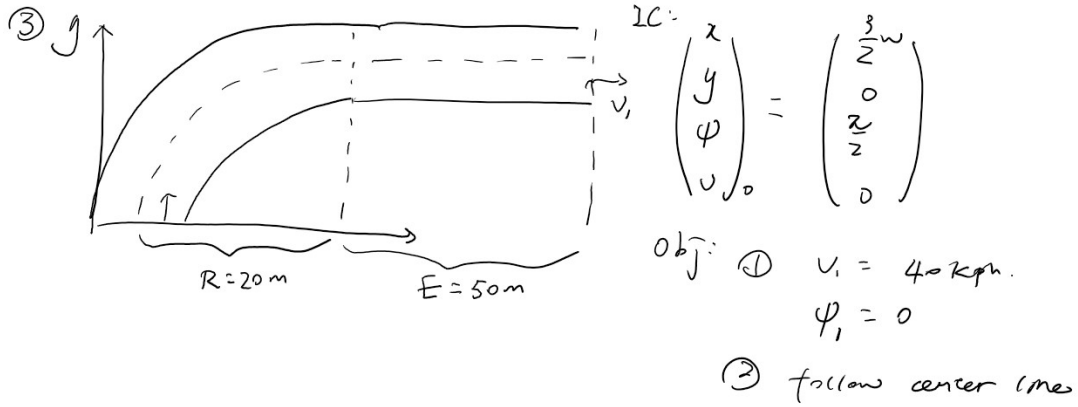
3.1. Straight Line (TestTrack1.csv)



3.2. Half Circle (TestTrack2.csv)



3.3. Right Turn (TestTrack3.csv)



3.4. Double Lane Change (To be updated)

3.5. Circuit of Americas Track Modified (TestTrack5.csv)