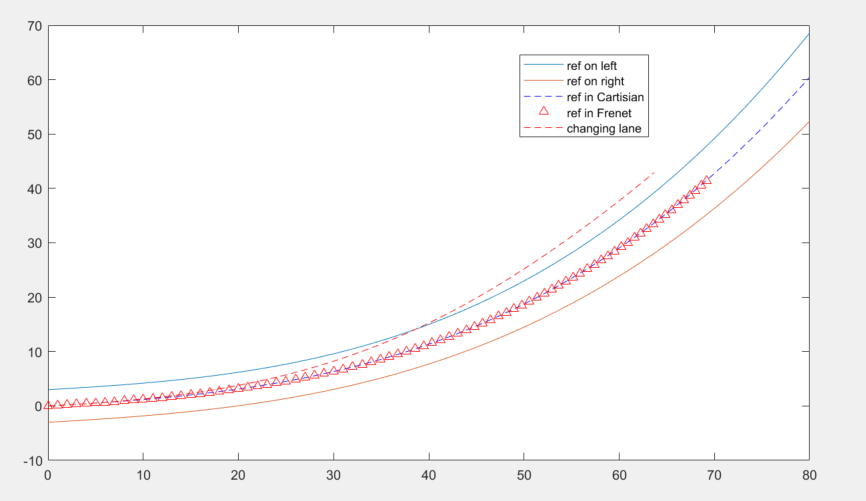
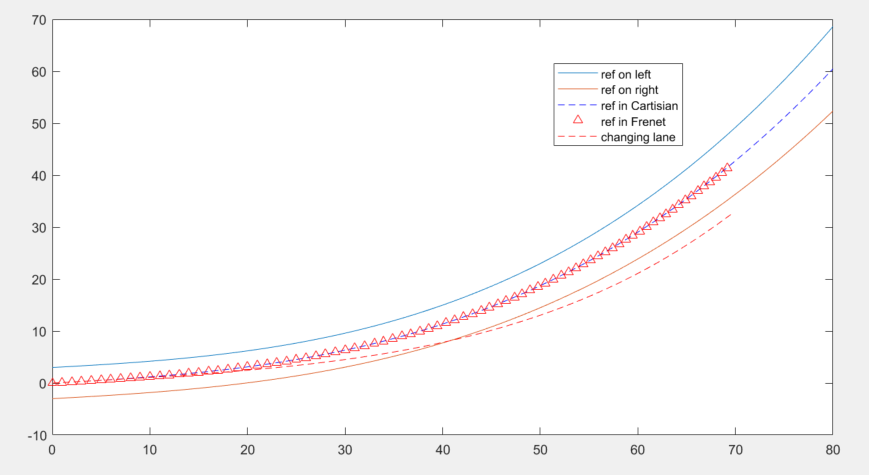
Test report

This report offers the test result in trajectory generation functionals.

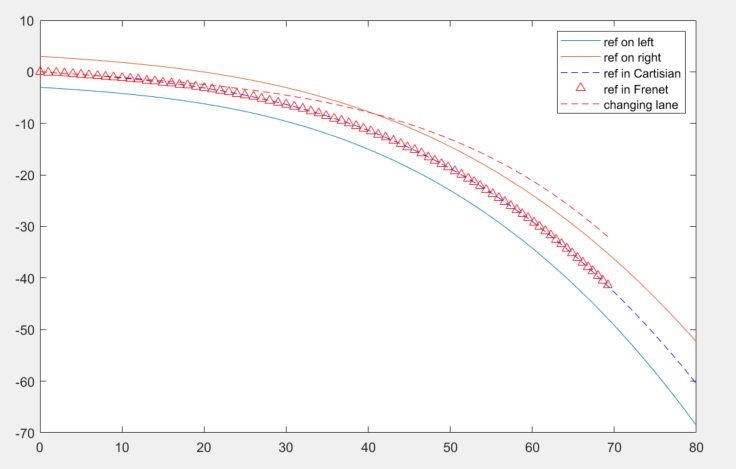
1. Lane change trajectory generation test. We generate the four cases where we apply lane change functionals.
   1. Vehicle turning left, with lane changing left



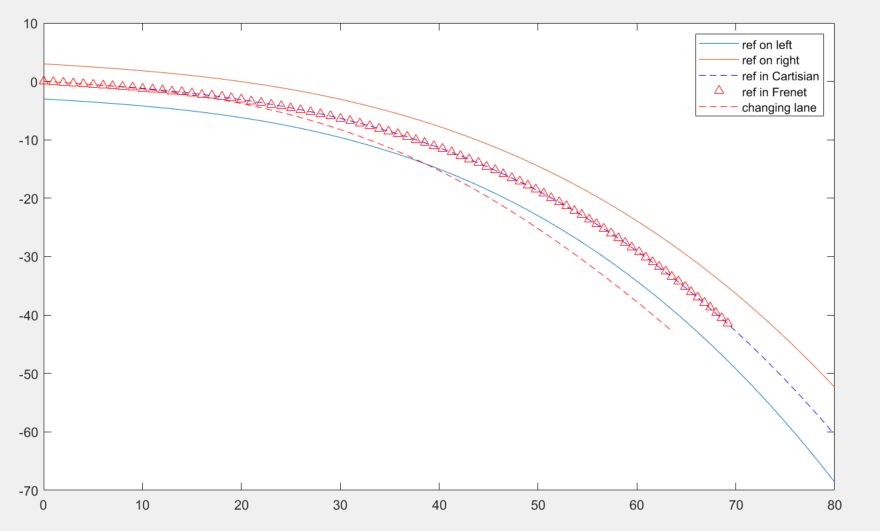
* 1. Vehicle turning left, with lane changing right



* 1. Vehicle turning right, with lane changing left



* 1. Vehicle turning right, with lane changing right



1. Comparison between two different center line generation

We have two difference methods in generating a sequence of center line waypoints for future use. One is, based on current polynomials of lanes on the left and right, discretely sample on Cartesian coordinate along x axis to get the y axis value, and calculate its mean value. And the other method is discretely sample under Frenet coordinate, which means it integrate along s direction. At each sample point, get the respective x value on each lane polynomial. We provide both methods realization and make comparison numerically.

* 1. Using Cartesian coordinate to generate a sequence of center line waypoints.



* 1. Using Frenet coordinate to generate a sequence of center line waypoints.



As you can see in the figure, the upper triangle line is using Frenet method, while the blue dashed line is using Cartesian method. They almost overlapped. As for the calculation time, we also make a comparison as follows:

The prerequisite is that both methods generate a sequence of trajectory of 80m, and the sampling resolution is about 0.2m, which means about 400 points will be generated. The calculation time is (with CPU performance i7-9750H @2.60GHz and RAM 32G):

Using Cartesian method:

*reference\_1 generation time is: 1.680400 ms*

Using Frenet method:

*reference\_2 generation time is: 4.659700 ms*

1. Fda
2. ewew