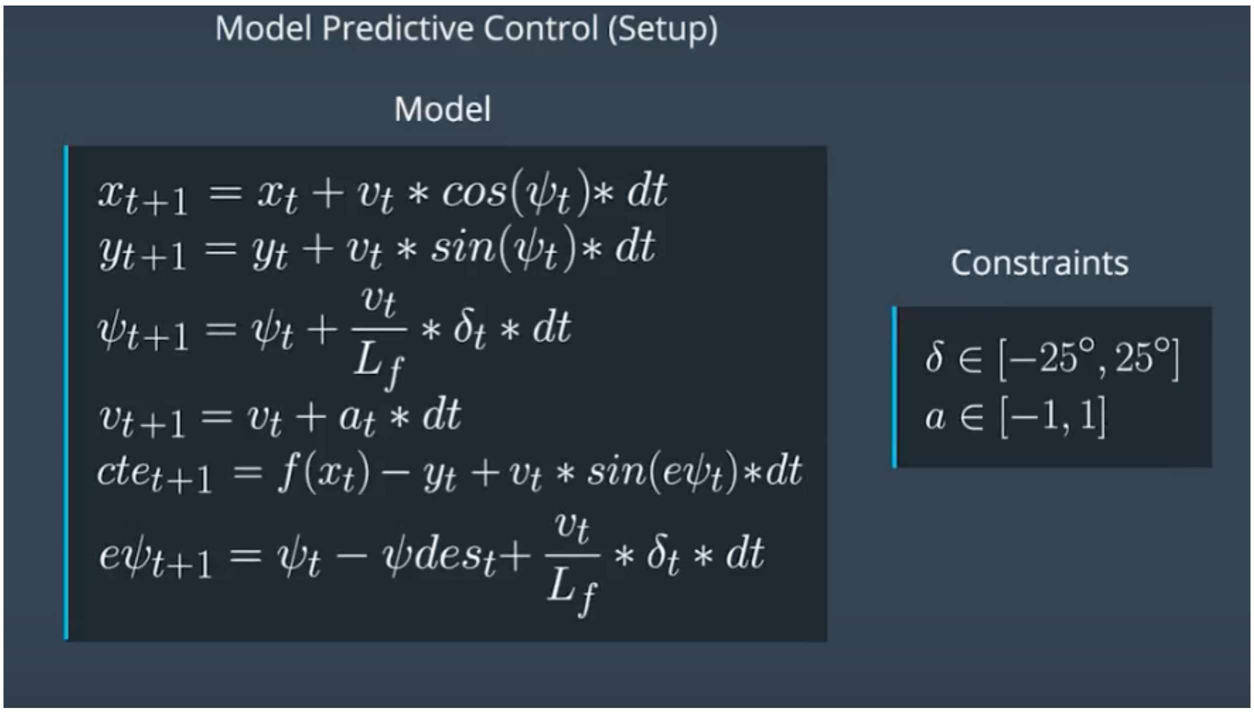
Project 5 MPC Controller

Your code should compile.:

It compiles.

The Model:

The model used is the kinematic model. Dynamics of the system have not been included.



The inputs (acceleration and steering) have constraints on them. The model has an augmented state vector composed of the x, y position, the orientation/angle, the speed, the cross track error and the orientation error.

Timestep Length and Elapsed Duration (N & dt):

The values were chosen to account for latency. N is 15 and dt is .11s. This means each dt prediction predicts future value after the latency has passed. N = 15 seemed to predict enough data points to handle latency well.

Polynomial Fitting and MPC Preprocessing:

Had to convert global position points to vehicle frame/coordinate system.

Model Predictive Control with Latency:

To deal with latency an attempt was made to predict the state of the vehicle .1 s in the future and used to initialize the state vector. This strategy is based on the suggestion in the course to handle latency. It was tricky to find reliable cost multipliers. Hence another approach was used in which the 2nd actuator values were used instead of the first one to account for the latency. The N and dt terms were chosen in such a way so that the latency is smaller than dt. The prediction is hence slightly ahead of the .1 latency position.