Project 9 (PID Controller - Parameter Tuning Reflection)

1. Describe the effect each of the P, I, D components had in your implementation.

   Proportional - Proportional term represents how far you are from how you want to be and how hard you want to steer back to the center of the road.

   Integral - The Integral term represents whether the car “leans” towards one side of the tracks.

   Differential - The Differential term represents how ‘hard’ the car oscillates around the centerline.

2. Describe how the final hyperparameters were chosen.

   Proportional - Originally I set this value close to 5.0, but the car would change steering angles too fast and would cause ‘wobbling’. After trial and error, and continually reducing this term, I set my final p-term equal to 0.1. This value was sufficient enough in producing a slower turning angle to realign with the center of the track.

   Integral - Originally, I had this value as zero, but I discovered that by increasing it by a small amount (0.0001) the car was better able to remain in the center of the track.

   Differential - I had originally set this term equal to 0, but after several trial and error runs, I realized that this value was important in the car’s ability to realign with the center of the road. This term is used to minimize the amount of change when realigning, and I found that a value of 4.0 was enough to allow the car to ‘gracefully’ return to the center of the track.