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

P is used to scale cross track error in proportion. As the P coefficient increases, the system can reach to reference line faster. However, with the augment of P, the response curve is going to start oscillating.

I is used to eliminate static error. Without I components, P controller may yield static error even the system is in equilibrium.

D is used to improve system dynamic response characteristics and reduce system latency.

Describe how the final hyperparameters were chosen.

First, I set I and D equal to 0, the PID controller is just a P controller. I increase P until the response curve start to oscillate. I divide P parameter by 2 and use this value as P value.

Second, I set I to a small value, and increase it until overshoot is not very big.

Finally, I just set D to a very small value to improve the dynamic response characteristics.