This documents acts as the supplemental guide to the project and provides an explanation of the hyper parameters chosen for the project.

Effects of PID Parameters

The section defines the effect of each of the PID parameters

- Kp: The gain factor for the 'Propotional Error', controls the reaction of the Car's steering inversely proportional to the cross track error (cte). Increasing this parameter increases the responsiveness of the steering though at the expense of more oscillations
- Kd: The differential gain dampens the oscillations, increasing this parameter will reduce oscillations.
- Ki: The integral gain eliminates residual error or drift, making sure the car stays on track.

Parameter Selection

The default parameters were chosen as : Kp = 0.2, Kd = 3.0, Ki = 0.004.

With the default parameters the car was driving around the track but oscillations were observed around corners and turns.

To reduce oscillations, the KD parameter was increased to its selected value of **4.0**.

With increased Kd, the responsiveness of the system at corners /turns was low causing the car to go very close to the edges. The Kp parameter was then increased to 0.4 but caused high oscillations so it was eventually reduced to **0.25** to get the best tradeoff between responsiveness and oscillations.