WriteUp P8: PID Controller

Introduction

This document is the model documentation for PID Control project. This document is part of the project submission located at https://github.com/mmarouen/CarND-PID-Control
I ran the code without red flags on my local machine using the following configuration:
Graphics: **800 x 600**
Quality: **simple**

Parameters selection

I follow a "grid search" principle to find the best combination of parameters.
For ***P*** and ***D*** try 3 possible values: {**0.1**, **1.0**, **10**} for ***I*** I try {**0.001**, **0.01**}
This gives us a total of 18 possible combinations. For each combination I did qualitative evaluation of the car's behavior. The best combination is highlighted in red.

P	I	D		P	I	D
0.1	0.001	0.1		1.0	0.01	0.1
0.1	**0.001**	**1.0**		1.0	0.01	1.0
0.1	0.001	10.0		1.0	0.01	10.0
0.1	0.01	0.1		10.0	0.001	0.1
0.1	0.01	1.0		10.0	0.001	1.0
0.1	0.01	10.0		10.0	0.001	10.0
1.0	0.001	0.1		10.0	0.01	0.1
1.0	0.001	1.0		10.0	0.01	1.0
1.0	0.001	10.0		10.0	0.01	10.0

Around this combination I refine the selection ***P***={**0.1**, **0.3**}, ***I***={**0.001**, **0.003**}, ***D***={**1.0**,**3.0**}
This gives us 8 refined combinations. I keep the final combination after qualitative examination of the car's behavior.

P	I	D
0.1	0.001	1.0
0.1	**0.001**	**3.0**
0.1	0.003	1.0
0.1	0.003	1.0
0.3	0.001	1.0

0.3	0.001	3.0
0.3	0.003	1.0
0.3	0.003	1.0

Improvement areas

1. Implement Twiddle algorithm for optimal parameters selection
2. Tune speed PID