Velocity Profiling Methodology

1. Max velocity from lateral acceleration limits:

$$v = \sqrt{\frac{a_{y\,max}}{kappa}}$$

2. Max velocity from steering rate:

$$v = \frac{ds}{dsteering_{max}} \frac{dsteering}{dt}$$

3. Max velocity from longitudinal acceleration limits:

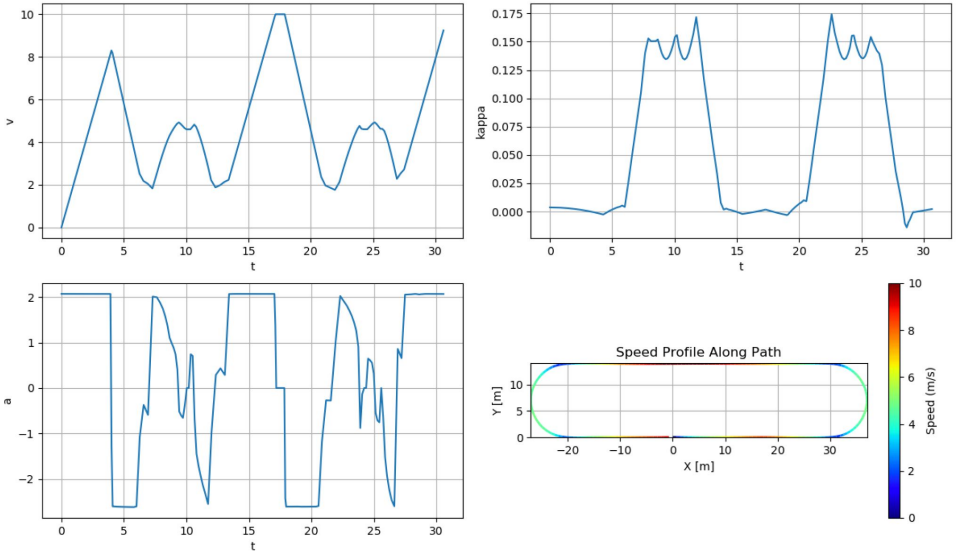
$$\frac{a_x}{a_{x\,max}}^2 + \frac{a_y}{a_{y\,max}}^2 = 1$$

$$a_y = v^2 * kappa$$

$$v(i)^2 = v(i+1)^2 + 2 * a_x * ds$$

After calculating the velocities, they are used to create a Trajectory to pass to the controller (Stanley)

Velocity, Kappa, Acceleration, Velocity Profile



Control Results - Stanley + PID