

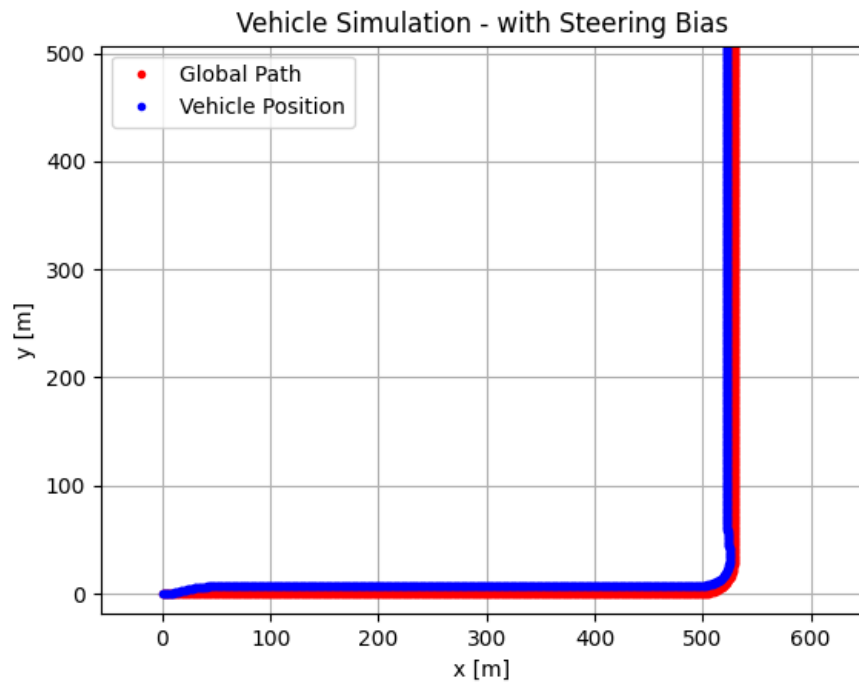
VehicleProject

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Theoretical Questions Answers:

1. In case of a bias in the steering system, we will get a lateral error from the reference path. Showing a simulation result plot for 5 [deg] bias:



We get ~ 7 [m] bias from the path.

2. In case of velocities faster than ~ 5 [$\frac{\text{m}}{\text{s}}$], dynamics effects are more dominant and should be taken into account. Therefore, we will calculate the accelerations - linear and angular - from the forces and torques that applying on the vehicle. Forces and torques that can be take into account in faster speeds - drag and slippage friction.

3. the integration method based on the limis definition:

$$\frac{df}{dt} = \lim_{\Delta t \rightarrow 0} \frac{f(t + \Delta t) - f(t)}{\Delta t}$$

Therefore, i chose an integration method of:

$$x(k+1) = x(k) + \dot{x}(k) \cdot \Delta t$$

I chose an integration step of $\Delta t = 1 \times 10^{-3}$ [s] for accurate enough calculations.