HyConSys Lab: AWS DeepRacer

10.09.2021

1 Mathematical Model

$$\begin{aligned} \dot{x}_1 &= x_4 \cos(x_3) \\ \dot{x}_2 &= x_4 \sin(x_3) \\ \dot{x}_3 &= \frac{x_4}{L} \tan(u_1) \\ \dot{x}_4 &= a x_4 + b u_2, \end{aligned} \tag{1}$$

where $(x_1, x_2) \in [-2.1, 2.1]^2$ is the car's postion, $x_3 \in [-\pi, \pi]$ is its orientation, $x_4 \in [-1.9, 1.9]$ is its forward velocity, $L := 0.165$ is its length, $u_1 \in [-\pi/8, \pi/8]$ is the steering angle, $u_2 \in [-0.7, 0.7]$ is the control input to rear wheels, $(a, b) := f(u_2)$, and f is an imperically-identified static map.