Vehicle open-loop input-output data acquisition

Data preprocessing

Appropriate data volume N and prediction horizon L

$$H_L(U) = \begin{bmatrix} u(0) & u(1) & \cdots & u(N-L) \\ u(1) & u(2) & \cdots & u(N-L+1) \\ \vdots & \vdots & \ddots & \vdots \\ u(L-1) & u(L) & \cdots & u(N-1) \end{bmatrix}$$

$$H_L(Y) = \begin{bmatrix} y(0) & y(1) & \cdots & y(N-L) \\ y(1) & y(2) & \cdots & y(N-L+1) \\ \vdots & \vdots & \ddots & \vdots \\ y(L-1) & y(L) & \cdots & y(N-1) \end{bmatrix}$$

Construct Hankel matrix

Determine if the input sequence is persistently exciting

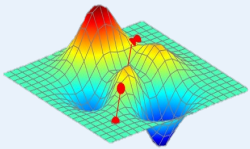
N

Determine if the issue is caused by data quality

Y

N

Y



Optimization Algorithm Design

carSIM MECHANICAL SIMULATION

MATLAB & SIMULINK

Simulation based on CarSim & Simulink

Verification and analysis of simulation experiment results