

Discrete-time Design of Adaptive Sliding-Mode Control

Sliding-mode techniques have proved to be advantageous when considering systems with uncertainties. However, the discrete-time implementation of sliding-mode control introduces new problems like discretization-chattering. Also, unknown inputs can no longer be completely rejected in discrete-time, which is achieved by continuous-time sliding-mode control. Direct adaptation methods aim to automatically adapt the controller gains in order to reject inputs of unknown magnitude. Indirect adaptation methods estimate unknown parameters of the plant. The implementation of adaptation methods in discrete-time often is not straight-forward. These difficulties in discrete-time are addressed in this project.

- Application and evaluation of different discretization methods.
- Minimizing discretization-chattering
- Discrete-time design of direct and indirect adaptation methods.
- Stability proof of the closed-loop systems with Lyapunov's direct method.

