

Sliding Mode Control in a Statistical Framework

Measurement noise is unavoidable in real-world physical systems.

The high-gain nature of **sliding mode control** amplifies measurement noise, which can degrade tracking performance and yields undesirable high-frequency control signals. Thus, incorporation of statistical analyses into the development of sliding mode algorithms is necessary to improve robustness to stochastic influences.

The goal of this project is to analyze the behavior of sliding mode algorithms under noisy conditions using **statistical methods**: Foster-Lyapunov functions, Markov chains and Monte Carlo, statistical signal processing

- development of statistically optimal sliding mode controllers/estimators
- statistical analysis of sliding mode control properties
- simulation of control and estimation algorithms, validation in experiments

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