Abstract

This paper relates generally to sliding mode control (SMC) system based on uncertainty and disturbance estimation (UDE) and more particularly to a system, with the presence of high frequency measurement noise and unmodeled dynamics. Higher order dynamics are difficult to identify and remain excluded from theoretical model of the system, generally the main cause of instability. The presence of unmodeled dynamics results in undesirable oscillations, affects overall stability and leads to limited control performance. Uncertainty and disturbance estimator is presented for estimating the perturbation. External low-pass filter is used to filter out the high frequency noise and UDE to reduce sensitivity to sensor noise and instability effect due to unmodeled dynamics up to certain limit. With the help of low-pass filter and UDE, the undesirable oscillations can be suppressed and the system stability can also be improved by proper selection of estimation filter time constant of uncertainty and disturbance estimator.

Reference
- Shendge P. D. and Patre B. M. 2006. Robust model following load frequency sliding mode controller based on uncertainty and disturbance estimator. In International Conference on Control (Glasgow, UK, August 2006).
Robust Sliding Mode Control for Systems with Noise and Unmodeled Dynamics based on Uncertainty and Disturbance Estimation (UDE)


Index Terms

Computer Applications

Linear Systems

Key words

Sliding Mode Control
Uncertainty and Disturbance Estimation
Noise
Unmodeled Dynamics