

On the design of output feedback sliding mode control for a class of uncertain system

Abstract:

In this study, output feedback sliding mode control (OFSMC) is proposed for a class of system with the uncertainties present in its output matrix. The uncertain output exist in practical system is mainly due to measurement error contributed by sensor noise or low measurement resolution. Sliding Mode Control (SMC) approach is able to provide a promisable solution due to its robustness toward system uncertainties and disturbances, However, OFSMC has imposed a greater challenge due to inaccessibility to all of the system states. In this work, an OFSMC is designed in which the actual system output will follow the desired trajectory in spite of the presence of uncertainties. The control law is designed based on Lyapunov function which the proposed controller guarantees the asymptotic convergence of the output. The sliding surface is formulated such that stability of the reduced-order system is maintained and the convex formulation of the problem is solved by using Linear Matrix Inequality (LMI). Simulation result based on a numerical example is obtained to demonstrate the efficacy of proposed method.