Abstract

In this paper optimal second order sliding mode controller for uncertain systems by using integral sliding surface is proposed. The optimal controller is designed based on linear quadratic regulator (LQR) method for nominal model of the system. In optimal control method, the LQR is combined with sliding mode control to obtain equivalent control and switching control. The sliding mode controller is designed using integral sliding surface to obtain the value of switching control and to equivalent control values are obtained using LQR technique. It is observed that LQR and integral sliding mode control method are more efficient compare to other conventional techniques. Stabilization of inverted pendulum system is done using the sliding mode control approach. The system of inverted pendulum is used in state space approach. The main advantages of this method is that disturbance rejection, insensitivity to parameter variations and implementation issues are addressed easily using proposed controller stabilization of inverted system. The simulation result conform an advantage of the designed optimal sliding mode control approach in terms of output responses and stabilization of the system.
References


Index Terms

Computer Science

Control Systems

Keywords

linear uncertain systems, optimal control, linear quadratic regulator, integral sliding surface,
non-singular terminal sliding surface, second order sliding mode control.