

عنوان مقاله:

Design of Optimal Sliding Mode Control based on Linear Matrix Inequality for Fractional Time-Varying Delay Systems

محل انتشار:

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خلاصه مقاله:

This paper considers an optimal sliding mode control based on the cost control guaranteed approach using the linear quadratic regulator method to stabilize delay fractional under involved disturbance. We propose an approach to an open research problem in the design of an LMI-based sliding mode controller in which there are some constraints such as optimizing system performance. The sliding mode technique is well-known as an effective tool for calculating the transient response of the system and achieving robust system performance. LQR classic techniques are less effective for studying an optimal fractional system in the presence of disturbance due to nonlinearity, so we use the optimal sliding mode approach control law designed for the nominal system and, then, combined it with a fractional sliding mode controller. By using the Razumikhin theorem for the stability of fractional order systems with delay and linear matrix inequality, conditions on asymptotically stabilization were obtained. The presented controller stabilizes the nominal system and guarantees an adequate level of system performance. The sliding mode controller presented in the article, in addition to eliminating the effect of disturbance in the system, is independent of the delay. A numerical example was provided to illustrate the effectiveness of the main results.

کلمات کلیدی:

Delay Systems, Integral sliding mode, Linear quadratic regulator, Fractional order systems

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