



Journal Menu

- Abstracting and Indexing
- Aims and Scope
- Article Processing Charges
- Articles in Press
- Author Guidelines
- Bibliographic Information
- Contact Information
- Editorial Board
- Editorial Workflow
- Reviewers Acknowledgment
- Subscription Information

- Open Special Issues
- Published Special Issues
- Special Issue Guidelines

Call for Proposals for
Special Issues

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Research Article

Discrete-Time Sliding-Mode Control of Uncertain Systems with Time-Varying Delays via Descriptor Approach

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Abstract

This paper considers the problem of robust discrete-time sliding-mode control (DT-SMC) design for a class of uncertain linear systems with time-varying delays. By applying a descriptor model transformation and Moon's inequality for bounding cross terms, a delay-dependent sufficient condition for the existence of stable sliding surface is given in terms of linear matrix inequalities (LMIs). Based on this existence condition, the synthesized sliding mode controller can guarantee the sliding-mode reaching condition of the specified discrete-time sliding surface for all admissible uncertainties and time-varying delays. An illustrative example verifies the effectiveness of the proposed method.

- Abstract
- Full-Text PDF
- Full-Text HTML
- Linked References
- How to Cite this Article