



# INTERNATIONAL JOURNAL OF **Robust and Nonlinear Control**

CALL FOR PAPERS

## **Special Issue:**

Homogeneous Sliding-Mode Control and Observation

**Special issue guest editors:** Dr. D. EFIMOV, Dr. S. LAGHROUCHE, Prof. L. FRIDMAN

The design of Homogeneous Sliding Mode Controllers (HSMC) and Homogeneous Sliding Mode Observers (HSMO) constitutes an important and popular research direction, which is based on the theory of homogeneous systems. Introduction of homogeneity in the closed-loop dynamics guarantees many useful properties, like insensibility with respect to the matched perturbations, keeping non-asymptotic convergence with respect to the sliding output for systems with arbitrary relative degree, and robustness against unmatched disturbances and noise. It turns out that homogeneity also ensures robustness against small delays, discrete sampling, relative degree fluctuations and fast unmodelled dynamics. Moreover, the rate of convergence (finite-time or fixed-time) can easily be shown to be dependent on the degree of homogeneity and the asymptotic accuracy of the resulting system is the best possible under given assumptions.

The purpose of this Special Issue is to present a state-of-the-art collection of articles presenting novel developments and results in the theory and practice of HSMC/HSMO. The proposed Special Issue will focus on advanced and non-standard methods, presenting the remarkable innovations in both theoretical background and applications. Articles expounding applications in nascent fields are particularly welcomed.

**Topics to be covered in this special issue include, but are not limited to the following:**

### **HSMC/HSMO design**

- Homogeneity based finite- and fixed-time convergent controllers/observers
- Lyapunov function approach to homogenous control and observation algorithms
- Adaptive homogenous control and observation

### **Properties of HSMC/HSMO**

- Analysis of chattering in HSMC
- Robustness properties (iISS/ISS) of HSMC
- Convergence time estimation
- Analysis of precision and accuracy of HSMC/HSMO

### **Implementation issues of HSMC/HSMO**

- Discrete realization of HSMC/HSMO
- Saturation of continuous HSMC
- Applications of HSMC/HSMO

All submissions will be subjected to review, and acceptance will be limited to papers needing only moderate revisions. Manuscripts should be submitted electronically online at:

<https://mc.manuscriptcentral.com/rnc-wiley>

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### **Important dates:**

**Submission of Manuscript**

November, 15<sup>th</sup>, 2019

**Notification of Acceptance**

May, 1st, 2020

**Final Manuscript Due**

Sept 1st, 2020

**Tentative Publication Date**

Early 2021