POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

STER PROGRAMME

name of the unit:		symbol:
DEPARTMENT OF ELECTRICAL DRIVES AND INDUSTRIAL AUTOMATION Institute of Automatic Control, Lodz University of Technology		I-21 http://zneiap.p.lodz.pl
head of the unit:	potential promoters:	contact person:
Prof. Andrzej Bartoszewicz, PhD, DSc	Prof. Andrzej Bartoszewicz, PhD, DSc	Prof. Andrzej Bartoszewicz, PhD, DSc phone: 48-42-631-25-47 andrzej.bartoszewicz@p.lodz.pl

scope of activities:

Our main area of interest is discrete-time sliding mode control and its applications. The group's efforts are focus on:

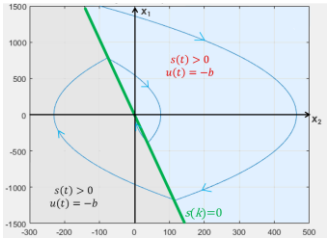
- Optimal sliding mode control.
- Switching and non-switching type sliding mode control for discrete-time dynamical systems.
- Application of higher relative degree sliding variables in variable structure control systems.
- Model reference based quasi-sliding mode control strategies.
- Nonlinear and time-varying sliding hyperplane design in variable structure control for continuous-time and discrete-time dynamical systems.
- Sliding mode control applications.

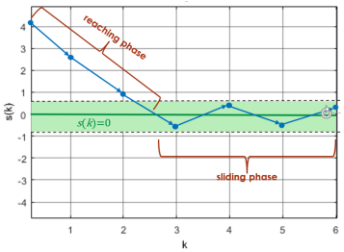
present activities:

Our current research directions are:

- Design and application of sliding mode control for discrete-time dynamical systems with state and control signal restrictions.
- Design and application of event-triggered discrete-time sliding mode control.
- Design and application of reference trajectory based sliding mode control for discrete-time dynamical systems.
- Applications of variable structure control strategies in power electronics and electrical drive control.
- Application of sliding mode control in inventory management.
- Application of discrete-time sliding mode control to congestion control in communication networks.

graphic material





Future activities:

Design of sliding control for discrete-time dynamical systems with applications in power electronics, electric drives, logistics and data transmission networks.

The portfolio of research groups was created as part of the Programme "STER" – Internationalisation of doctoral schools" as part of the realization of the project "Curriculum for advanced doctoral education & taining – CADET Academy of Lodz University of Technology".

Publications/patents, awards, projects:

Publications:

- Latosiński P., Bartoszewicz A.: Model reference DSMC with a relative degree two switching variable. IEEE Transactions on Automatic Control, Vol. 66, No. 4, 2021, pp. 1749-1755.
- Bartoszewicz A., Adamiak K.: Discrete time sliding mode control with a desired switching variable generator. IEEE Transactions on Automatic Control, Vol. 65, No. 4, 2020, pp. 1807-1814.
- Leśniewski P., Bartoszewicz A.: Optimal model reference sliding mode control of perishable inventory systems. IEEE Transactions on Automation Science and Engineering, Vol. 17, No. 3, 2020, pp. 1647-1656.
- Shah D., Mehta A., Patel K., Bartoszewicz A.: Event-triggered discrete higher-order SMC for networked control systems having network irregularities. IEEE Transactions on Industrial Informatics, Vol. 16, No. 11, 2020, pp. 6837-6847.
- Bartoszewicz A., Nowacka-Leverton A.: Time-Varying Sliding Modes for Second and Third Order Systems, Springer-Verlag, Berlin Heidelberg, 2009 (192 strony, ISBN 978-3-540-92216-2).

Research projects:

- Optimal sliding mode control for delay systems (Opus no. 01/B/ST7/02582).
- Design of sliding hyperplanes for variable structure control of dynamical systems (N N514 300035).
- Nonlinear and time-varying sliding hyperplane in variable structure control (8T11A 016 12).

Keywords:

discrete-time systems, sliding mode control, robust control

List of internship proposal in this research team:

Internship in the area of discrete-time sliding mode control.