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Politechnika Łódzka
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ZAPRASZAJĄ DO UDZIAŁU W SEMINARIUM

VARIABLE STRUCTURE CONTROL SYSTEMS - A SURVEY DEDICATED TO 30 YEARS OF DISCRETE-TIME QUASI-SLIDING MODE

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DISCRETE-TIME SLIDING MODE BASED CONTROL OF ELECTRICAL DRIVES

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Czas i miejsce

5 października 2015, godz. 10:15
Sala seminaryjna WEEIA

Udział w seminarium jest bezpłatny.

Organizatorzy

Dyrektor Instytutu Automatyki PŁ
Prof. dr hab. Inż.
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VARIABLE STRUCTURE CONTROL SYSTEMS - A SURVEY DEDICATED TO 30 YEARS OF DISCRETE-TIME QUASI-SLIDING MODE

Streszczenie

The paper provides an overview of the sliding mode (SM) control systems evolution, with special review on the contributions of Russian scientists as founders of variable structure control system (VSCS) theory, as well as authors from former Yugoslavia and other countries who greatly contributed in development and applications of those systems. VSCS are characterized by excellent theoretical properties, such as prescribed system dynamics in SM and invariance (robustness) to matched parameter perturbations and external disturbances. The basic notions, analysis and design of VSCS are presented for continuous- and discrete-time domain. Particular attention is given to some discrete-time sliding mode control algorithms, recognized by the SMC community. Practical problems arising in implementation of DSM controllers are particularly emphasized. Closeness between the theoretical and practical features of VSCS in SM properties has been experimentally confirmed on several realized control systems.

DISCRETE-TIME SLIDING MODE BASED CONTROL OF ELECTRICAL DRIVES

Streszczenie

This work presents experiences in control of electrical drives by using discrete-time sliding mode control approach. Two types of electrical drives will be considered. Direct current (DC) servomotors and three-phase asynchronous squirrel-cage motors (induction motors (IM)). Firstly, mathematical model of general three-phase electrical machine is given from which appropriate models of IM and DC motors are derived. The main focus is on realization of robust positional and velocity servo systems. Therefore, some structures and methods for position and velocity control of electrical drives are presented. Special attention is dedicated to disturbance estimation and compensation in order to gain robustness in discrete-time domain preserving chattering-free behavior. The presented results are demonstrated and verified by numerous experiments, conducted on IM as well as DC motor. The given experimental results illustrate high performance of the proposed structures and algorithms.



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Życiorysy wykładowców



Čedomir Milosavljević was born in the former Yugoslavia in 1940. He received the B.Sc. degree from the Faculty of Automatic and Computer Science, Moscow Power Institute, Moscow, Russia, in 1966, the M.Sc. degree from the Faculty of Electronic Engineering, University of Niš, Niš, Serbia, in 1975, and the Ph.D. degree from the Faculty of Electrical Engineering, University of Sarajevo, Sarajevo, Bosnia and Herzegovina, in 1982. From 1967 to 1977, he was with Electronic Industry Corporation, Niš. From 1979 to 2005, he was with the Faculty of Electronic Engineering, University of Niš, where he was the organizer of the graduate and postgraduate studies in the field of automatic control and the

Founder of the Laboratory of Automatic Control. Since 1997, he has been a Visiting Professor with the Faculty of Electrical Engineering, University of Istočno Sarajevo, Bosnia and Herzegovina. He has published over 200 papers, mainly on variable-structure systems, and eight textbooks. He has designed over 50 devices in the areas of power supply, motion control, and industrial electronics. He is a pioneer in investigations of discrete-time slidingmode control. His research interests include sliding modes, motion control systems, and industrial electronics.



Boban Veselić was born in Niš, Serbia, in 1970. He received the Dipl. Ing., M.Sc., and Ph.D. degrees in automatic control from the Faculty of Electronic Engineering, University of Niš, Serbia, in 1994, 2000, and 2006, respectively. Since 1995, he has been with the Department of Automatic Control, Faculty of Electronic Engineering, University of Niš, Serbia. His major field of study is automatic control with special expertise in sliding mode control systems, on which he has published over 100 scientific papers. His current research interests include continuous- and discrete-time sliding mode control systems, disturbance estimation and compensation, servo systems, as well as control of electric drives.



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