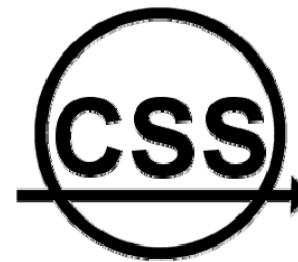
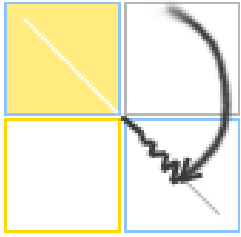


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TC on **VSS & SMC**  
**2016-2 Meeting**



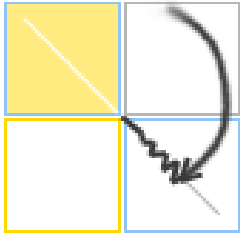


# EC of TC **VS&SMC** **Meeting 2016-2**

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1. TC Goals and Structure
2. New EC member
3. Organization of the schools
4. Books publication
5. Special Issues
6. Workshops organization
7. Special Sessions organization

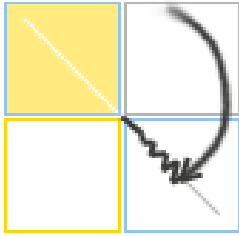


# The goals of the TC

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- **Coordination** of the work of the groups
- **Organization** of Workshop
- **Organization** of School for young researchers
- **Publication** of books and Special Issues
- **Organization** of Special Sessions/Workshops in CDC,ACC,IFAC



# TC VS&SMC Structure

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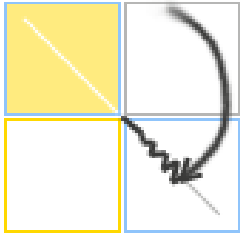


Community Member (they do not need to be IEEE CSS members)

## Rights

- Receive all of the information about the community
- Send the proposals, suggestions, information about new publications

To be community member it is necessary to register in the mail list of VSS community [ieee-vssmc@listserv.tau.ac.il](mailto:ieee-vssmc@listserv.tau.ac.il)



# TC VS&SMC Structure

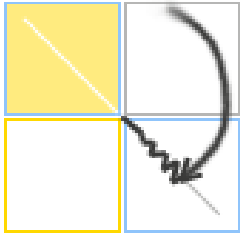
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Members (they need to be IEEE CSS members)

## Rights

Level 1 + send to TC chair a request to a elaborate membership letter



# TC VS&SMC Structure

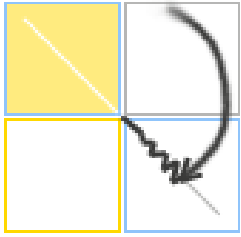
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## Level 3. Executive Committee

### Rights

- Level 2
- +
- Receive EC information
- Send proposals for EC members
- Votes for decisions



# TC VSS&SMC Structure



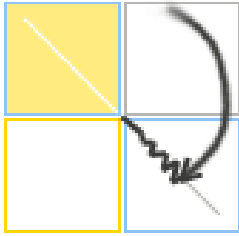
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Level 3. Executive Committee members

Proposal by Professor Utkin

Each EC member candidate should be approved by consensus of EC members

**The other rules are obsolete!**



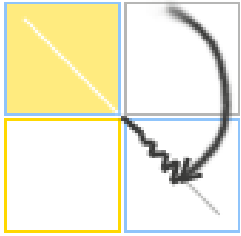
**NEW EC MEMBER  
CONGRATULLATIONS!**



Dr. Elisabetta Punta, CNR ITALY,

<http://www.sct.ieiit.cnr.it/index.php?sec=2&art=123>





# Books publication

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## Book in Progress

Advances in Variable Structure Systems and Sliding Mode Control -Theory and Applications

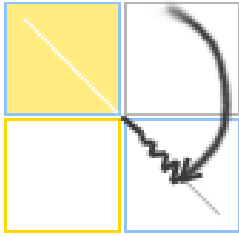
co-editors:

Leonid Fridman, Xinghuo Yu, Shihua Li, Zhihong Man

Springer Verlag: Studies in Systems, Decision and Control

15 chapters submitted

To be published before IFAC 17



# Schools



## IEEE FALL SCHOOL on Modern Sliding Mode Control



October 26 – 30, 2016

Sponsored by IEEE Control Systems Society

-: Speakers :-



Leonid  
Fridman



Jaime  
Moreno



Katsuhisa  
Furuta



Sarah  
Spurgeon



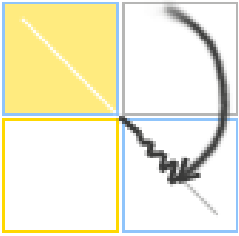
Bijan  
Bandyopadhyay

-: Venue :-

VMCC, Indian Institute of Technology Bombay, Mumbai, India.

9500 USD support from IEEE CSS

65 participants!!!



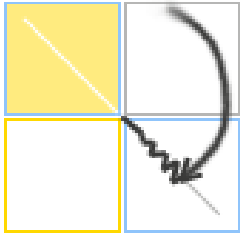
# Summerschools

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Summer school (proposal submitted to IEEE CSS)

Early September 2017, Schloss Seggau, Steier, Austria



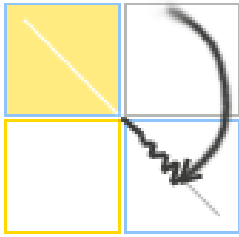
# Workshop

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## Pre CDC16 Workshop

Continuous Higher-Order Sliding Modes Controllers.  
Organizers: L.Fridman, J. Moreno



# Course announcement



Pre CDC16 Workshop

Continuous Higher-Order Sliding Mode Controllers.  
Organizers: L.Fridman, J. Moreno



## International Graduate School on Control

[www.eeci-igsc.eu](http://www.eeci-igsc.eu)

**M23 – PARIS-SACLAY**  
06/06/2017-09/06/2017

**Modern Sliding Mode Control**



**Leonid Fridman**  
Facultad de Ingeniería  
Universidad Nacional  
Autónoma de México  
[lfridman@unam.mx](mailto:lfridman@unam.mx)

The sliding mode methodology has been proved to be effective in dealing with complex dynamical systems affected by disturbances, uncertainties and un-modelled dynamics. These robustness properties have also been exploited in the development of nonlinear observers for state and unknown input estimation. In conventional (first-order) sliding modes a "switching function" (typically an algebraic function of the states) is forced to zero in finite time and maintained at zero for all subsequent time. Recently, higher-order sliding modes have been developed to force the switching function and a number of its time derivatives to zero in finite time.



**Jaime Moreno**  
Instituto de Ingeniería  
Universidad Nacional  
Autónoma de México  
[jmorenop@ii.unam.mx](mailto:jmorenop@ii.unam.mx)

**Specific features of the course**  
We will present a novel Lyapunov based approach for the design of first-, second- and higher-order sliding modes controllers (SMC), including sliding mode controllers producing continuous control signals, and some of its applications.

**Outline of the course**

**Introduction**

- Solutions of equations with discontinuous right hand sides. Finite- and fixed- time convergence.
- Lyapunov design of first-order sliding modes. Smooth and Lipschitz Lyapunov Functions. Unit Control
- Regular form. Sliding surfaces design
- Integral sliding modes

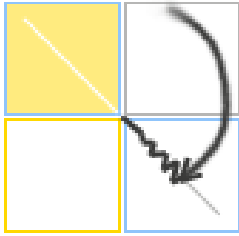
**Second-Order Sliding Modes Controllers(SOSMC)**

- Lyapunov based design for SOSMC (twisting and terminal)
- Lyapunov-Based design for Super-Twisting Controller

**Higher-Order Sliding Modes Controllers (HOSMC)**

- Lyapunov- Based design for HOSMC (continuous and discontinuous)
- Gain Design for HOSMC: Some Alternatives: Nonlinear inequalities, Pólya's theorem and Sum of Squares method





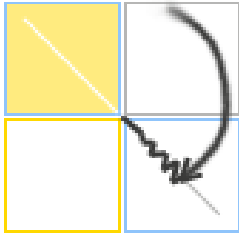
# Special Issues

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## Special Issues published

1. Y. Shtessel, L. Fridman, F. Plestan. Adaptive Sliding Mode Control and Observation International Journal of Control, vol. 89, no 9, pp. 1743-1746, DOI: 10.1080/00207179.2016.1194531.
2. T. Roux Oliveira, L. Fridman, R. Ortega. From Adaptive Control to Variable Structure Systems – Seeking for Harmony, Special Issue in Honor of Professor Liu's 70th Birthday, Int. J. Adapt. Control Signal Processing, vol. 30 no.8-10, 2016, pp.1074-1080, DOI : 10.1002/acs.2705  
080/00207179.2016.1194531



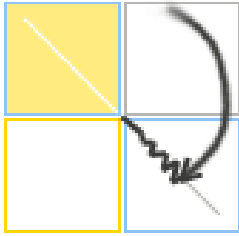
# Special Issues

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## Special Issue in course

“Sliding Mode Control and Observation for Complex Industrial Systems” on IEEE Transactions on Industrial Electronics, organized by Prof. Ligang Wu, Prof. Sudip K. Mazumder, and Prof. Okyay Kaynak



# Special Issue Announced

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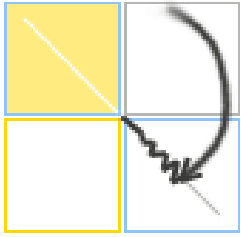
## International Journal of Control Differentiators

**Quest Editors:** M. Reichhartinger, D. Efimov, L. Fridman

### Authors Schedule

- Submission of Manuscript January, 31st, 2017
- Notication of Acceptance September, 1st, 2017
- Final Manuscript Due Novemeber, 1st, 2017
- Tentative Publication Date June, 2018





Special Sessions for IFAC 2017

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## Open Invited Track

# Sliding Mode Control Design: Fundamental Concepts and New Challenges

**Organisers:** V. Utkin, Y. Orlov

22 papers submitted

## Differentiators

**Organisers:** M. Reichhartinger, D. Efimov, L. Fridman

7 papers submitted