Call for Registration and Participation

An Indo-French Seminar on

Advances in Robust Nonlinear Control for Uncertain Dynamic Systems: Theory and Applications

Dates: April 15-19, 2024
Venue: Indian Institute of Technology Roorkee

Host Faculty & Course Coordinator from India
Dr. Sohom Chakrabarty
Department of Electrical Engineering
Indian Institute of Technology Roorkee

Course Coordinator from France
Dr. Franck Plestan
École Centrale de Nantes

Sponsored by
Indo-French Centre for the Promotion of Advanced Research (IFCPAR)
https:// https://www.cefipra.org//

SEMINAR/WORKSHOP OVERVIEW

Modern technological systems are becoming more and more complex; as a consequence, the control design to ensure the desired performances of these systems is becoming more and more challenging. It is essential for researchers and industry practitioners to understand these challenges from both theoretical and practical point of view. The workshop is conceptualized to disseminate state-of-the-art research and its application in the advanced robust and nonlinear control, especially using the framework of sliding mode theory. The latter has many advantages such as robustness, accuracy and simplicity, and is increasingly used in the context of engineering and industrial applications. A lot of developments have taken place in the last two decades, such as homogeneity, adaptive gain, neural network, event-triggering, etc. in sliding mode theory. These results have also been applied to a huge variety of complex systems such as energy systems, microgrids, multi-agent systems, etc. The seminar/workshop is intended to train and impart knowledge to young professionals from both academia and industry on this class of very recent techniques and methodologies available for the control of complex systems.

The seminar would bring together leading researchers from France and India working on diverse fields of nonlinear control theory including sliding mode control. The diverse expertise of the speakers on robust sliding mode control for uncertain/disturbed nonlinear systems will emphasize not only the fundamental aspects but also its recent developments. Moreover, the applications of control theory to energy systems, robotics, etc., will also be included in the seminar.

The primary objectives of the course are as follows:

i) Providing exposure to the participants on the state-of-the-art in sliding mode control and observation.

ii) Build confidence and capability amongst the participants in the application of robust control and estimation tools and techniques.

iii) Providing exposure to the participants on practical problems and their solutions, through case studies and projects.

iv) Providing a platform for future collaboration between Indian and French researchers.

To achieve these objectives, in addition to the technical sessions that will cover a variety of state-of-the-art topics, poster sessions will be organized during the seminar that will facilitate one-to-one interaction between the participants and the experts. Participants who wish to present their work in these poster sessions may send a one-page abstract to the Indian coordinator, and subject to his approval can present a poster on the same work during the seminar.

TOPICS TO BE COVERED

1. Introduction to Variable Structure and Sliding Mode Control
2. Adaptive Sliding Mode Control
3. Event-triggered Sliding Mode Control
4. Introduction to sliding mode differentiators and homogeneous sliding mode control
5. Sliding Mode Control of complex systems with case studies
6. Discrete time formalization of sliding mode
7. Advanced topics, such as arbitrary time stabilization and set-valued sliding mode control

WHO SHOULD ATTEND?

- Industry Professionals
- Students in the area of Control Systems /Physics/Mathematics/ Engineering
    - PhD/M.Phil/PG/UG (final year)
    - Post-PhD and Pre-PhD scholars
- Faculty members from Academic Institutions

- Members in Research Organizations such as DRDO, ISRO, etc.

COURSE REGISTRATION FEE

Participants	Programme Fee
Participants from Abroad **	INR 20000
Indian Participants from Industry	INR 15000
Indian participants from Academia, GoI organizations and self-sponsored	INR 10000
Indian students at all levels (UG/PG/PhD)	INR 5000
IIT Roorkee students (UG/PG/PhD)	INR 2000

The above fee is towards instructional materials, computer use for tutorials, 24 hr free internet facility, light refreshments, etc.

Outstation participants may request to book accommodation in institute guest house or hostels on payment basis, subject to the availability of rooms. Request for the same is to be made through registration form.

** We encourage international participation and are providing the facility to attend the seminar in online mode for overseas candidates. Please note we are unable to provide any certificate for obtaining visa other than a confirmation of registration to the seminar.

REGISTRATION PROCESS
Registration is a two-step process.

Step 1: Online Payment
Please pay online to the following account. Note down the registration fee relevant to you. In case of any confusion, please approach the Indian coordinator Prof. Sohom Chakrabarty.
Save the transaction record for Step 2.

A/c Name: **Conference, Seminar, Symposium & Wshop IIT ROORKEE**
State Bank of India, IIT Roorkee Branch.
A/C No: **33136732957,** IFSC Code: **SBIN0001069,**
MICR Code: **247002094,** SWIFT Code: **SBININBB559**
PAN No: **AAALI0033R,** GST No: **05AAALI0033R1Z5.**

Step 2: Seminar Registration
Submit your registration details using the form link below. You can also scan the QR code.

Documents you need ready for upload –
(i)   Payment transaction record.
(ii)   Employer/Student/Personal ID.
(iii) Passport copy (only for foreign participants)

Form Link - https://forms.gle/qfjqKUhbaiZiRCAm6

Form QR code –

IMPORTANT NOTE
Due to limited seat, the organizers reserve the right to not select all the participants for physical attendance. In this case, preference will be given on first come basis. If not selected, the registration fee will be returned back.
However, the registration fee is non-refundable once the participant is shortlisted for the seminar.
Last Date for Payment of Seminar Registration fee is ~~31 March 2024~~ extended to 5th April, 2024.

We have approached for funds from some sponsoring agencies. If we are successful in obtaining these funds, we could be able to reimburse travel and accommodation for the following categories of participants –
- Women candidates, up to 20 numbers.
- Candidates with financial constraints, up to 20 numbers.
- Candidates with background other than control systems, up to 20 numbers.

Preference will be given to students and self-sponsored candidates in this case.

IIT ROORKEE
The Indian Institute of Technology Roorkee has an illustrious history and a glorious past. It has its foundation in the Thomson College, which was founded in 1847, to train technical manpower for construction of Ganga canal. It was the first Engineering College in the then British Empire. In The year 1949, this great institution was accorded the status of the first technological university of independent India and was renamed as University of Roorkee. On September 21, 2001, the Government of India declared it as the Nation's seventh Indian Institute of Technology.

COURSE COORDINATOR
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Technical Tracks and Speakers

Technical Track	Lecture Title	Expert Speaker	Speaker Affiliation
Adaptive Sliding Mode Control	Adaptive sliding mode control – Part I	Dr. Franck PLESTAN	École Centrale de Nantes, France
	Adaptive sliding mode control – Part II	Dr. Mohamed HAMIDA and M. Mohammad MIRZAEI	École Centrale de Nantes, France
	Robust and adaptive sliding mode nonlinear controls for floating wind turbines	Ms. Flavie DIDIER and M. Ehsan ASLMOSTAFA	UTBM, France École Centrale de Nantes, France
	Barrier function-based adaptive higher order sliding control	Dr. Hussein OBEID	University of Caen Normandy, France
Event-Triggered Sliding Mode Control	Sliding mode control: application and event-triggered approach	Dr. Kiran KUMARI	IISc Bangalore, India
	Robust Tracking Control of Wheeled Mobile Robot: An Event-Triggered Design	Dr. Manas K BERA	NIT Rourkela, India
	Sliding Mode Observers with Event-Triggered Feedback	Dr. Abhisek BEHERA	IIT Roorkee, India
Discrete Time Sliding Mode Control	Set-valued sliding mode control: maximal monotonicity and implicit discretization techniques for chattering cancellation	Dr. Félix MIRANDA-VILLATORO	INRIA Grenoble-Rhone Alpes, France
	Sliding Mode with Higher Relative Degree Sliding Variable in Discrete Time Setting	Dr. Sohom CHAKRABARTY	IIT Roorkee, India
	Discrete-time Sliding Mode and Multirate Output Feedback	Dr. S JANARDHANAN	IIT Delhi, India
Real-world Applications of Sliding Mode Control	Practical Applications of Sliding Mode Control with Chattering Analysis in Frequency Domain	Dr. Vishvjit THAKAR	Indrashil University, India
	Robust Control of DC Microgrid: Voltage regulation and Ripple Distribution	Dr. Deepak FULWANI	IIT Jodhpur, India
	Modelling and control of large size Nuclear Reactors	Dr. Bijnan BANDYOPADHYAY	IIT Jodhpur, India
	Optimal Integral Sliding Mode Control of a Nuclear Reactor	Dr. A P TIWARI	IIT Mandi, India
	Discrete-time Sliding Mode Protocols for Multi-Agent System	Dr. Axaykumar MEHTA	IITRAM, India
	Sliding Mode Observer Designs in Discrete Time Setting for a Modular Multilevel Converter	Jagannath SAMANTARAY and Dr. Rupak CHAKRABORTY	IIT Roorkee, India IIT Roorkee, India
Advances in Sliding Mode Theory	Differentiation based on sliding mode	Dr. Malek GHANES	École Centrale de Nantes, France
	Arbitrary Time Stability and Stabilization	Dr. Shyam KAMAL	IIT BHU, India
	Output Tracking for Systems with Unstable Zero Dynamics using Reduced-order Sliding Mode Control	Dr. Machhindranath PATIL	VESIT, India
	Sliding mode-like control techniques	Dr. Denis EFIMOV	INRIA Lille, France
	Homogeneous unit sliding mode control	Dr. Andrey POLYAKOV	INRIA Lille, France