

# Robust Control: Attractive Ellipsoid Method (AEM) and Sliding Mode Control (SMC) [#171031D06]

## Overview

The objective of the course consists in the introduction of students (and other assistants) in the real dynamic world containing a lot of uncertain factors as well as perturbations essentially affecting the behavior of the system we intend to control. A comprehensive highlights or features of this course are as follows,

- This course introduces a newly developed control design technique for a wide class of continuous-time models governed by ODE with incomplete information on their dynamic description.
- Along with a coherent introduction to the required mathematical background (block matrix, Schur's complement, LMIs and their applications), two main problems are discussed: control of uncertain systems under the complete and incomplete state availability. The last situation requires the implementation some sort of state – observers or “soft-wear filters”.
- Two basic methods are presented in details: Attractive Ellipsoid Method (AEM) and Sliding Mode Control (SMC). Both of them contain new results, recently published in books and papers of prestigious publishers and journals.
- While all require theorems are proved systematically, the emphasis will be on understanding and applying the considered theory to real-world situations.
- During the course for all students (or any other assistants) there will be presented a set of exercises and home-tasks, which will be discussed after the course in the Tutorial sessions.

<b>Dates</b>	<b>06 November to 11 November 2017</b>
<b>Place</b>	<b>Department of Electrical Engineering, National Institute of Technology, Silchar, Assam, India.</b>
<b>Modules</b>	<b>A: Necessary Mathematical Background LMI Nov 06 - Nov 07</b> <b>B: Attractive Ellipsoid Method, Roust State feedback Design : Nov 08</b> <b>C: Sliding Mode Control &amp; its Variant: Nov 09 – Nov 11</b> <b>NUMBER OF PARTICIPANTS FOR THE COURSE WILL BE LIMITED TO FIFTY (50)</b>
<b>Who can Participate...</b>	<ul style="list-style-type: none"> <li>• Interested graduate students.</li> <li>• Some undergraduate students who took before the course “Introduction in Control”.</li> <li>• Researchers in the fields of control engineering and applied mathematics.</li> <li>• The teachers and professors who wish to obtain the complementary material for their graduate courses in Advanced Robust Non linear Control.</li> <li>• Participation from outside NIT Silchar will be given preferences.</li> </ul>
<b>Fees</b>	<b>Participants from abroad: USD 500</b> <b>Industry/ Research Organizations: Rs. 10000/-</b> <b>Academic Institutions</b> <input type="checkbox"/> <b>Faculty: Rs. 5000/-</b> <input type="checkbox"/> <b>External Students: Rs. 1000/-</b> <input type="checkbox"/> <b>Internal PG &amp; PhD Students: Rs. 500/-</b> <input type="checkbox"/> <b>Internal UG Students: Nil</b> The above registration fee is towards instructional materials, computer use for tutorials, 24 hr free internet facility, light refreshments etc. The outstation participants will be provided twin sharing accommodation on payment basis in Institute Guest House if available.

## The Faculty



Prof. Alexander S. Poznyak (Alexander Semion Pozniak Gorbach) was graduated from Moscow Physical Technical Institute (MPhTI) in 1970. He earned Ph.D. and Doctor Degrees from the Institute of Control Sciences of Russian Academy of Sciences in 1978 and 1989, respectively. From 1973 up to 1993 he served this institute as researcher and leading researcher, and in 1993 he accepted a post of full professor (3-F) at CINVESTAV of IPN in Mexico. 8years he was the head of the Automatic Control Department. He is the director of 41 PhD thesis's (37 in Mexico). He has published more than 210 papers in different international journals and 13 books. He is Regular Member of Mexican Academy of Sciences and System of National Investigators (SNI-Emerito from 2014). He is Fellow of IMA (Institute of Mathematics and Its Applications, Essex UK) and Associated Editor of Oxford-IMA Journal on Mathematical Control and Information, of Kybernetika (Czech Republic), Nonlinear Analysis: Hybrid systems (IFAC) as well as Iberamerican Int. Journal on "Computations and Systems". He was also Associated Editor of CDC, ACC and Member of Editorial Board of IEEE CSS. He is a member of the Evaluation Committee of SNI (Ministry of Science and Technology) responsible for Engineering Science and Technology Foundation in Mexico, and a member of Award Committee of Premium of Mexico on Science and Technology. In 2014 he was invited by the USA Government to serve as the member of NSF committee on "Neuro Sciences and Artificial Intelligence".

## Course Coordinator



**Dr. Rajeeb Dey** is an Assistant Professor in the Department of Electrical Engineering, NIT Silchar, Assam, India. His research interest includes time-delay system analysis and robust control. He has worked and discussed many issues on control with Prof. Poznyak during his postdoctoral stay in Mexico.

## Course Coordinators

### Contact Details

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**Phone: +91-7086731971**

**E-mail: rajeeb.iitkgp@gmail.com**



# National Institute of Technology Silchar

(An Institute of National Importance by MHRD, Govt. of India)  
Silchar, Assam – 788 010



## GIAN: Global Initiative of Academic Network

An Initiative of



Ministry of Human Resource Development  
Government of India

**Course Name: Robust Control: Attractive Ellipsoid  
Method (AEM) and Sliding Mode Control (SMC)  
Course No. 171031D06**

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### Registration Process

#### Registration Guidelines (Step-by-Step):

- First, 'web register' at GIAN 'Courses Registration Portal': <https://goo.gl/AhcCyS> by paying Rs. 500 in the GIAN portal. This is not the GIAN course fee which you intend to attend. If you're already registered in GIAN portal then skip this step.
- Next, log into the GIAN portal and click 'Course Registration' tab on the GIAN Portal, and 'check box' to select this course (#171031D06) from the list. Click 'save' to register, and 'Confirm Course(s)' to confirm.
- Now, pay the requisite Course Fee online in favour of the **Director, NIT Silchar, A/C No: 10521277057, IFSC Code: SBIN0007061, MICR Code: 788002004**. Keep the payment info (transaction # & date) handy. You'll need this during the next step. **Also, please retain the receipt for on-spot submission.**
- Post payment, fill up the "Registration Form" included here.
- Next, email the followings (i) Registration form, (ii) Payment proof, (iii) Scan copy of valid Identity card/bonafide letter (in case you are a student), to course coordinator, at: [rajeeb.iitkqp@gmail.com](mailto:rajeeb.iitkqp@gmail.com) (You will get an acknowledgement within 24/48 hours).
- For successful enrolment, make sure you've made both the payments.
- Number of participants for the course is limited to 50, and the registration will be open till the seats are filled.

**P.S.** Registering on the GIAN portal does not guarantee participation in the course. Please do not confuse with web registration with course registration. You might have been 'shortlisted' after paying the 500/-, but your selection is subject to paying the requisite course fee to NIT.

For queries and clarifications, write to the Course Coordinator at:

[rajeeb.iitkqp@gmail.com](mailto:rajeeb.iitkqp@gmail.com)

**N.B: Please retain the original receipt (in case Demand Draft)/one photocopy (in case online transfer) for on-spot submission/verification.**

# GIAN: Global Initiative of Academic Network

## Course: Robust Control: Attractive Ellipsoid Method (AEM) and Sliding Mode Control (SMC)

6<sup>th</sup> November – 11<sup>th</sup> November 2016

Place: Dept. of EE, NIT Silchar

### REGISTRATION FORM

Affix Photo

GIAN Portal Application Number:

Full Name:

Category: (Industry/Academic/Student)

Organization:

Address:

Email Id:

Mobile Number:

Highest Academic qualification:

Payment option and details:

a. Demand draft:

Draft No.	Bank	Date:

b. Online transaction

Transaction ID/Ref. No	Bank	Date:

Accommodation Required: Yes/No (*please Tick in the applicable field*)

Date:

(Signature)

Place: