

# Robustness, Fragility, Optimality and Modern PID Control

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## Overview

Control in the presence of uncertainty is one of the main topics of modern control theory. In the formulation of any control problem there is always a discrepancy between the actual plant dynamics and its mathematical model used for the controller design. These discrepancies (or mismatches) mostly come from external disturbances, unknown plant parameters, and parasitic dynamics. Designing control laws that provide the desired closed-loop system performance in the presence of these disturbances/uncertainties is a very challenging task for a control engineer. This has led to intense interest in the development of the so-called robust control methods, which are supposed to solve this problem. This course will provide an introduction to the analysis and design of robust feedback control systems covering the major developments in the field from 1860 to 2017. The course is directed at researchers and graduate students and therefore insightful proofs of most of the results will be provided.

This course will give a balanced coverage of elegant mathematical theory and useful engineering oriented results that can serve the needs of a diverse group of students/researchers from Electrical, Instrumentation, Mechanical, Chemical, Aerospace, and Civil Engineering as well as Computer Science and Mathematics.

Course participants will learn these topics through lectures and computer aided simulations. Also case studies and assignments will be shared to stimulate research motivation of participants.

<b>Course Information</b>	<b>Duration: 11<sup>th</sup> December 2017– 20<sup>th</sup> December 2017</b> <b>Place: Department of EIE, NIT Silchar, Assam, India</b> <b>Total Contact Hours: 32 hrs in 10 days</b>	
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>▪ you are students (BTech/MSc/MTech/PhD) , researchers and faculty members in all areas of engineering and applied sciences working on control and control applications.</li> <li>▪ you are practicing engineers working on control and control related applications in aerospace, automobile, medicine, space-sciences, structural dynamics, manufacturing, robotics, power systems and many others.</li> <li>▪ you are engineers from industries from all areas of engineering working on control and control applications including R&amp;D laboratories.</li> <li>▪ you are computational mathematicians and other scientists desirous of learning of how to deal the uncertainties arise in control systems design and analysis and are solved using sophisticated techniques of robust control theory.</li> </ul>	
<b>Fees</b>	<ul style="list-style-type: none"> <li>▪ Participants from abroad:</li> <li>▪ Industry/ Research Organizations:</li> <li>▪ Academic Institutions                             <ul style="list-style-type: none"> <li>○ Faculty:</li> <li>○ External Students:</li> <li>○ Internal PG &amp; PhD Students:</li> <li>○ Internal UG Students:</li> </ul> </li> </ul>	<p>USD 500</p> <p>Rs. 10000/-</p> <p>Rs. 5000/-</p> <p>Rs. 1000/-</p> <p>Rs. 500/-</p> <p>Nil</p>
<p>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.</p> <p><b>Number of participants for the course will be limited to fifty.</b></p>		

## The Faculty



**Prof. S.P. Bhattacharyya** is the Robert M. Kennedy Professor of Electrical Engineering at Texas A & M University. He received the B.Tech degree in Electrical Engineering from IIT, Bombay in 1967, and the MS and PhD degrees in Electrical Engineering from Rice University, Houston, Texas in 1969 and 1971 respectively. He is an IEEE Fellow, an IFAC

Fellow and a member of the Brazilian Academy of Sciences. He has coauthored 7 books, over 100 journal publications and 250 conference publications in the field of Control Theory. He is also an accomplished concert artist and plays Indian Classical Music on the Sarode internationally.



**Dr. Manas Kumar Bera** is an Assistant Professor in the department of Electronics & Instrumentation Engineering, NIT Silchar, Assam, India. His research interest is robust control theory, sliding mode control and its applications.

## Course Co-ordinator

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Registration  
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Course website: