State-of-the-Art Computational Methods and Software for Computer-Aided Control Systems Design and Analysis

Overview

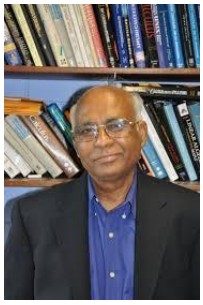
During the last two decades, numerically viable algorithms and associated software have been developed for most of the important tasks arising in control systems design and analysis. Unfortunately, these techniques and the software do not seem to be widely known and/or are not being widely used by a broad group of control theorists and practicing engineers. The primary reason for this appears to be that an understanding, efficient implementations, and making appropriate modifications of these methods as needed for applications of special interests, require an interdisciplinary knowledge and expertise of scientific computing, control theory, and computer science; and such a combined expertise is hard to acquire without spending a great deal of time by taking many diversified courses in different disciplines. What is needed, therefore, a self-sufficient course that can explain the computational algorithms and software in a rather elementary and user-friendly way without going into the depth of the associated numerical linear algebra techniques and relevant mathematical theory. The proposed course aspires to do that. The lectures will be organized to clearly explain the algorithms in a manner that is suitable for easy implementations on computers, the important aspects of implementations will be clearly discussed, a clear and concise comparative study of one algorithm over the others for a given problem will be presented and recommendations, based on that study, will be made for the engineers.

Mathematical and computational jargon that seem to be distractive for most engineers and other applied scientists to learn these techniques will be avoided. The minimal amount of numerical linear algebra background that are absolutely essential to understand the material will be presented in the course itself in a conceptual way, but giving the details of software and implementation issues.

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

Dates	**01 December to 11 December 2016**
Place	**Department of Electrical Engineering, National Institute of Technology, Silchar, Assam, India.**
Modules	**A: Linear Algebra, Control Theory, Numerical methods: Dec 01 - Dec 05** **B: Controller, Observer Designs : Dec 06 - Dec 08** **C: Active Vibration Control Problem: Dec 09 – Dec 11** **NUMBER OF PARTICIPANTS FOR THE COURSE WILL BE LIMITED TO FIFTY (50)**
Who can Participate…	• UG, PG students and research scholars of all areas of engineering and applied sciences, • Practicing engineers working on control and control related applications in following industries (but not limited to) - aerospace, automobile, bio-medical, space-sciences, structural dynamics, manufacturing, robotics, power systems etc. • Applied and computational mathematicians and other scientists desirous of learning of how linear algebra problems arise in control systems design and analysis and are solved using sophisticated techniques of numerical linear algebra. • Participation from outside NIT Silchar will be given first preferences.
Fees	The participation fees for taking the course is as follows: **Participants from abroad : US $500** **Industry/ Research Organizations: INR 10,000** **Academic Institutions (Faculty): INR 5,000** **Academic Institutions (Students) : INR 1,000** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.
Benefits from the courses	• Students can earn extra credit by attending this prestigious GIAN course taught by professor from foreign university. • Opportunity to learn numerical methods in control from an IEEE Fellow. • Opportunity for participant to formulate research problem with the experts. • Opportunity to establish research links with the faculty of Northern Illinios University, USA and other leading universities abroad. • Opportunity to solve hands on problems in advanced control theory and applications.

The Faculty



Prof. Biswa Nath Datta is a Professor of Mathematical Sciences, an Adjunct Professor of Electrical and Mechanical Engineering and a Distinguished Research Professor at Northern Illinois University, USA. He is an IEEE Distinguished Lecturer, a Fellow of IEEE and an "Academician" of the Academy of Nonlinear Sciences (Russia). Professor Datta has been honored in 2015 with "Fulbright-Nehru Distinguished Chair Award" by United States State Department with Indian-Institute of Technology-Kharagpur, India. He has served in the past and (or) presently serving on the editorial board for reputed journals (such as SIAM J. Matrix Analysis and Applications, Linear Algebra and its Applications (special editor); Numerical Linear Algebra with Applications; the Journal of Mathematical Systems, Estimation, and Control; and Mechanical Systems and Signal Processing).

Dr. Rajeeb Dey is an Assistant Professor of NIT Silchar, Assam, India. His research interest includes time-delay system analysis and control. He has established research collaboration with Prof. Datta on active vibration control.

Course Coordinators

Dr. Rajeeb Dey
Phone: +91-7086731971
E-mail: rajeeb.iitkgp@gmail.com

Mr. Lalu Seban
Mob: +91-8011886745
E-mail: laluseban.nits@gmail.com