

## Title of the Workshop

### “State of the Art Computational Methods and Software for Computer-Aided Control Systems Design and Software”

**Organizer:** Biswa N.Datta, *IEEE Fellow, Distinguished Research Professor*,  
Northern Illinois University, DeKalb, Illinois, USA.

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#### Short CV of Biswa Datta

Biswa Datta is a Distinguished Research Professor at Northern Illinois University, DeKalb, Illinois, and held visiting and distinguished visiting Professorships at many universities around the world. He was elected to a Fellow of IEEE in 2000, and as an “Academician” of Academy of Nonlinear Sciences in 2002 for his interdisciplinary contributions, blending linear algebra with control and systems theory. He authored more than 95 interdisciplinary papers, two books entitled “*Numerical Methods for Linear Control Systems Design and Analysis, 2003*”, and “*Numerical Linear Algebra and Applications, 1995*”, and the control engineering software package “*Control Systems Professional-Advanced Numerical Methods*”. He has delivered workshops at IEEE, SIAM, MTNS, and Asian Control Society Conferences. He has served on the editorial board of premier journals, and organized conferences and numerous special sessions for IEEE, AMS, SIAM, and MTNS.

**Objective:** This one-day workshop is designed to give a complete overview of the state-of-the-art computational methods and the associated software for control systems design and analysis.

**Abstract:** The workshop will present lectures on the state-of-the-art computational methods and software on almost all aspects of control systems. The lectures will be organized to clearly explain the algorithms in a manner that is suitable for easy implementations, the important aspects of computer implementations will be clearly discussed, a clear and concise comparative study of one algorithms over the others for a given problem will be presented and recommendations will be made for the practicing engineers. *Mathematical and computational jargon that seem to be distractive for most engineers to learn these techniques will be avoided.* The workshop will be of interests to the graduate students, researchers and practicing engineers working on a wide variety of control applications. The workshop will also help the instructors design a graduate level course on computer-aided control systems design and analysis.

# A TENTATIVE SCHEDULE

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

**Organizer:** *Biswa Datta*

**Presented by:** *Biswa Datta and others(TBA)*

9:00-10:00	Introduction. Basic Concepts: Modeling; System Responses; Controllability, Observability and Distance to uncontrollability; Stability, Robust Stability and Distance to Instability.
10:00-10:30	COFFEE BREAK
10:30-11:30	Feedback Stabilization (LQR Design), Numerical Methods and Conditions for Lyapunov, and Algebraic Riccati Equations (and possibly $H$ -Infinity Control).
11:30-12:30	Numerical Methods and Conditioning of Pole Placement, Algorithms for Observer Design, Kalman Filter, and LQG Design.
12:30-2:00	LUNCH
2:00-3:00	Model Reduction and Hankel Norm Approximation
3:00-3:30	COFFEE BREAK
3:30-4:15	System Identification
4:15-5:00	Control Software
5:00-5:30	Discussions