

M10 : An Introduction to Networked Control Systems

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Course description:

Increases in fast and inexpensive computing and communications have enabled a new generation of information-rich dynamic systems that rely on multi-threaded networked execution, distributed optimization, sensor fusion and cooperative control in increasingly sophisticated ways. This set of lectures will provide an introduction to the theory and tools for building such systems, focusing on the so-called “networked” control systems in which the components that form the system are connected through a communication network.

Topics:

1. Markov jump linear systems
2. Estimation and control in the presence of delay and packet loss
3. Effects of quantization
4. Information patterns
5. Distributed estimation and sensor fusion
6. Consensus and distributed control
7. Mitigating network effects using shock absorbers
8. Applications in cooperative control

	<p>Vijay Gupta is an assistant professor in the Department of Electrical Engineering at the University of Notre Dame, Indiana, USA. He received the B Tech degree from IIT Delhi in 2001, and MS and PhD degrees from Caltech in 2002 and 2007 respectively, all in Electrical Engineering. His research interests include networked control systems, sensor networks, computation constrained control, and other problems at the intersection of control, communication and computation.</p>
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	<p>Richard M. Murray received the B.S. degree in Electrical Engineering from California Institute of Technology in 1985 and the M.S. and Ph.D. degrees in Electrical Engineering and Computer Sciences from the University of California, Berkeley, in 1988 and 1991, respectively. He is currently the Thomas E. and Doris Everhart Professor of Control and Dynamical Systems and the Director for Information Science and Technology at the California Institute of Technology, Pasadena. Murray's research is in the application of feedback and control to mechanical, information, and biological systems. Current projects include integration of control, communications, and computer science in multi-agent systems, information dynamics in networked feedback systems, analysis of insect flight control systems, and biological circuit design.</p>
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