SYSTEMS, CONTROLS, AND ROBOTICS SEMINAR SERIES

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4:00 p.m. / 100 Harrington Education Classroom Center

Correct-by-Construction Synthesis of Reactive Control Protocols for Hybrid Systems

ABSTRACT

Modern control systems involved the analysis and design of feedback controllers at multiple levels of abstraction, from fast feedback loops around actuators and subsystems, to higher level decision-making logic in supervisory controllers and autonomous systems. In this talk we focus on work over the last 10 years by a variety of groups interested in specification and synthesis of decision-making logic for hybrid systems. This decision-making logic is responsible for selecting modes of operation for the underlying (continuous) control system, reacting to external events and failures in the system, and insuring that the overall control system is satisfying safety and performance specifications. Tools from computer science, such as model-checking and logic synthesis, provide new approaches to solving these problems, but require substantial modification to apply to modern networked control systems. This talk will provide an overview of the relevant theory and recent results in this area, as well as include examples of their application to autonomous vehicles and aircraft vehicle management systems.

BIO

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 & Dynamical Systems and Bioengineering at Caltech. Murray's research is in the application of feedback and control to networked systems, with applications in biology and autonomy. Current projects include specification, design and synthesis of control protocols for networked control systems and analysis and design of biomolecular feedback systems for synthetic biology.

Pizza will be served at 3:45 p.m.