2012-2013

Graduate Seminar Series

The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents

Professor Rafael Fierro
Department of Electrical & Computer Engineering
University of New Mexico

Rafael Fierro is an Associate Professor of the Department of Electrical & Computer Engineering, University of New Mexico where he has been since 2007.

He received a M.Sc. degree in control engineering from the University of Bradford, England and a Ph.D. degree in electrical engineering from the University of Texas-Arlington. Prior to joining UNM, he held a postdoctoral appointment with the GRASP Lab at the University of Pennsylvania (1999-2001) and a faculty position with the Department of Electrical and Computer Engineering at Oklahoma State University (2001-2007). His research interests include nonlinear and adaptive control, robotics, hybrid systems, autonomous vehicles, and multi-agent systems. He directs the Multi-Agent, Robotics, Hybrid and Embedded Systems (MARHES) Laboratory. Rafael Fierro was the recipient of a Fulbright Scholarship, a 2004 National Science Foundation CAREER Award, and the 2007 International Society of Automation (ISA) Transactions Best Paper Award. He is serving as Associate Editor for the IEEE Control Systems Magazine and IEEE Transactions on Automation Science and Engineering.

Thursday, Nov. 29, 2012 | 4:00 – 5:00 p.m. | Room 112, ME-EM Bldg.

Coordination Strategies for Robotic Networks

Advances in embedded processor and sensor technology in the last thirty years have helped accelerate interest in the field of robotics. As robots become smaller, more capable, and less expensive, there is a growing demand for teams of robots in various application domains. Robotic networks are particularly well suited to execute tasks that cover wide geographic ranges, require significant parallelization, and/or depend on capabilities that are varied in both quantity and difficulty. Example applications include littoral exploration and surveillance, rainforest health monitoring, autonomous transportation systems, warehouse automation, and hazardous waste clean-up. This talk focuses on synchronization strategies to control robotic networks. I will first discuss an adaptive binary consensus approach to decentralized coordination of nonholonomic sensor networks. I will then show that this binary consensus protocol not only improves the performance of the adaptive law but allows the compression of the date shared among the mobile sensors. Finally, I will describe our recent work on the problem of detecting changes in the topology of a robotic network through synchronization of chaotic oscillators.

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