Electrical & Computer ENGINEERING

ENERGY AND INFORMATION SEMINAR

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Monday, Oct. 6

Hammerschlag Hall Room B206 at 12:30 p.m.

Abhishek Gupta

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Dynamic Sequential Decision Problems with Asymmetric Information: Some Existence Results

Abhishek Gupta is currently a postdoc at University of Southern California. He recently completed his PhD in Aerospace Engineering department from UIUC. He completed his B.Tech. in Aerospace Engineering from IIT Bombay, MS in Aerospace Engineering from UIUC and MS in Applied Mathematics from UIUC in 2009, 2011 and 2012, respectively. His research lies at the intersection of stochastic control theory, optimization, game theory, and information theory. He has received Kenneth Lee Herrick Memorial Award 2014 for outstanding research and academic performance from Aerospace Engineering Department at UIUC, Mavis Future Faculty Fellowship in 2012-2013 from the College of Engineering at UIUC, and Narotam Sekhsaria Excellence in Undergraduate award in 2009 for excellent all-round performance during undergraduate studies.

Dynamic Sequential Decision Problems with Asymmetric Information: Some Existence Results

In this talk, we will discuss finite-horizon multi-agent dynamic decision problems. If the cost functions of all decision makers (DMs) are the same, then it is called a team problem, otherwise it is a game problem. At each time step, we assume that the DMs do not necessarily observe the same set of random variables. This leads to a game or a team problem with asymmetric information. We will discuss sufficient conditions under which (i) Nash equilibrium exists in a dynamic game of asymmetric information, and (ii) optimal strategies exist in a dynamic team of asymmetric information.

For dynamic games with asymmetric information, we will present a refinement concept for Nash equilibrium, which we call "common information based Markov perfect equilibrium" (CIMPE). For a class of LQG games, we prove that a unique CIMPE exists for every LQG game in that class, and it can be computed by solving a sequence of linear equations.

For dynamic teams with asymmetric information, we will show that a class of dynamic LQG teams with certain information structures (which may still be non-classical) admit team-optimal solutions. This result establishes the existence of optimal solutions in several different classes of stochastic teams with nonclassical information, including the celebrated Witsenhausen's counterexample, the Gaussian test channel, the Gaussian relay channel and their non-scalar extensions.

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