INDUSTRIAL & SYSTEMS ENGINEERING SEMINAR

Wednesday, October 10
3:15 PM – Refreshments before the seminar
3:30 PM – Graduate Seminar
Mechanical Engineering Room 4125 A & B

The Analysis and Solution of Stochastic Variational Inequality Problems

Professor Uday Shanbhag
Industrial and Enterprise Systems Engineering
University of Illinois at Urbana- Champaign

We consider the stochastic variational inequality problem in which the mappings contain expectations over a possibly general measure space and associated sets may be unbounded. In this talk, we consider two sets of questions. First, we provide tractable verifiable conditions for showing existence that do not necessitate integration. Important such conditions are provided for quasi-variational inequalities and complementarity problems and can further accommodate multivalued maps. Second, we discuss a stochastic approximation scheme for monotone stochastic variational inequalities in which steplength choices are chosen in accordance with problem parameters (Lipschitz constant, monotonicity constant etc.). It can be shown that such rules can be derived in networked regimes without a global coordinator. Since, maps may not admit Lipschitzian properties (or such constants may be difficult to estimate), we consider a local randomization scheme which allows for deriving a Lipschitz constant for a "smoothed" map and show how such techniques can be integrated within stochastic approximation. We present some preliminary numerical results obtained from applying such schemes to stochastic Nash-Cournot games.

Bio:Uday V. Shanbhag is an associate professor in the Harold and Inge Marcus Department of Industrial and Manufacturing Engineering. His research interests lie in the development of analytical tools and scalable computational schemes for optimization and equilibrium problems, with a focus on addressing competition, uncertainty, nonsmoothness and nonconvexity. Much of his research finds application in the realm of power systems and markets, where he has examined a range of questions, including the examination of strategic interactions in multi-settlement markets under uncertainty, the location of electrical substations and dynamic competitive equilibrium models. From 2006 to 2012, he was first an assistant professor and subsequently an associate professor (effective Summer, 2012) at the Industrial and Enterprise Systems Engineering (ISE) at the University of Illinois at Urbana-Champaign. His dissertation was awarded the triennial A.W. Tucker Prize by the mathematical programming society (MPS) in 2006. He was also awarded the NCSA Faculty Fellowship in 2006. He jointly received the Computational Optimization and Applications (COAP), best paper award with Walter Murray in 2007. He was shortlisted as one of 11 finalists for the Microsoft Faculty fellowship (2008) and was awarded the National Science Foundation (NSF) Faculty Early Career Development (CAREER) award in 2011 from the Operations Research program. Uday V. Shanbhag has a Ph.D. from Stanford University's department of Management Science and Engineering (2006), with a concentration in operations research and was associated with the Systems Optimization Laboratory when at Stanford. He also holds masters and undergraduate degrees from the Massachusetts Institute of Technology (MIT), Cambridge (in Operations Research) and the Indian Institute of Technology (IIT), Bombay, respectively.

FOR MORE INFORMATION ON PROFESSOR SHANBHAG'S RESEARCH, PLEASE VISIT: https://netfiles.uiuc.edu/udaybag/www/