EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Resource Allocation under Ambiguous Risk Preferences

ABSTRACT – Modern resource allocation problems arising in Ecommerce, online content recommendation, display advertising, etc. are characterized by three distinct features: (1) Large Scale Nature: These problems include hundreds of thousands of decision variables; (2) Real time or instantaneous decision making: There is a need to solve these problems in super-quick time in the order of milli-seconds ; (3) Ambiguous Risk preferences: The decision maker has ambiguous (unknown to the decision maker) risk attitudes which go beyond the standard mean-variance risk measures. In this talk, we consider such high dimensional resource allocation problems and model the risk preferences by using a class of risk-measures known as Coherent Distorted Risk Measures (CDRM) which include many well-known risk measures such as Conditional Value at Risk (CVaR), Wang Transform measure, Proportional Hazard measure, and Lookback measure, and Spectral risk measures. The uncertainty in risk preferences is captured by considering an uncertainty set of these risk measures. In this talk, we present a computationally tractable solution to this problem by identifying a structural result of the optimal solution which allows us to propose almost instantaneous solution. This property, which we refer to as the ``unique ordering property'' informs an ordering on the attractiveness of the projects which remains the same for any risk measure in this family. We discuss the implications of this property on the ability to solve these problems in a tractable manner, and on the ability to extend our approach to the case of ambiguous risk preferences.

Dr. Chaithanya Bandi
Assistant Professor
Managerial Economics & Decision Sciences
Northwestern – Kellogg School of Management

This is joint work with Professor Paat Rusmevichientong from the Marshall School of Business, USC.

SPEAKER BIO – Dr. Chaithanya Bandi joined the department of Managerial Economics and Decision Sciences at the Kellogg School of Management in 2013. He received a Ph.D in Operations Research from MIT, and a Bachelors Computer Science from IIT Madras. He has worked in technology and Financial services companies such as Google, Yahoo, Bell Labs, Lehman Brothers, and Investment Technology Group. Professor Bandi is broadly interested in the problems of decision making under uncertainty and incomplete information with applications to operations management. In particular, he has focused on developing Robust Optimization based models to formulate key problems in applications such as queueing control, risk optimization in portfolios, mechanism design, and online algorithms.

USC Viterbi
School of Engineering
Daniel J. Epstein Department of Industrial and Systems Engineering

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