

Speaker: Serdar Yuksel, Queen's University

Title: Convex Analysis in Stochastic Teams and Asymptotic Optimality of Finite Model Representations and Quantized Policies

Abstract:

This talk is concerned with stochastic dynamic team problems and their optimal solutions. To facilitate a convex analytical approach, strategic measures for team problems are introduced; these are probability measures induced by admissible team policies. Properties such as convexity and compactness are studied.

These lead to existence of and structural results for optimal policies. It will be shown that the set of strategic measures for a team problem is in general non-convex unlike single decision maker control problems, and cannot be convexified through the addition of common or independent randomness, but the extreme points of a relaxed set consist of deterministic team policies, which lead to their optimality. Refined characterizations of convexity for problems which include teams with a non-classical information structure will be presented.

Finally, asymptotic optimality of finite model representations for a large class of dynamic team problems will be established. These lead to asymptotic optimality of quantized control policies, so that one can construct a sequence of finite models obtained through the quantization of measurement and action spaces whose solutions converge to the optimal cost. Witsenhausen's counterexample is an important special case that will be discussed.
