

Department Colloquium

Speaker: Serdar Yüksel

Date: Friday, November 13

Time: 2:30 p.m.

Place: Jeffery 234

Title: Convexity Properties, Existence and Approximation of Optimal Solutions in Decentralized Stochastic Control

Abstract: This talk is concerned with stochastic dynamic team problems and their optimal solutions. First, a brief review on information structures in decentralized control will be presented. 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, compactness and Borel measurability are studied. These lead to existence of and structural results for optimal policies. It is shown that the set of strategic measures for a team problem is in general non-convex unlike single decision maker control problems, but the extreme points of a relaxed set consist of deterministic team policies, which lead to their optimality. Characterizations for convexity of 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, an important problem considered in the literature, will be discussed as a special case. (Part of this is joint work with Naci Saldi and Tamas Linder).