Cornell University $\mathbb{I}$*nformation,* $\mathbb{S}$*ystems, and* $\mathbb{N}$*etworks seminar*

Teams and Games for Distributed Consensus

Rhodes Hall 655: May 16, 2013 @ 12:00PM

ISN Seminar Speaker:
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Abstract

Synthesis of optimal controllers achieving finite-time consensus for multi-agent networks described by fixed connectivity graphs is considered. Under the situations where the connectivity graph is known to every agent or to a central authority at the outset, the network behaves as a team and the solution procedure involves posing a finite-horizon decentralized control problem and converting it to a static convex optimization problem via linear quadratic team-theoretic notions. The dynamic feedback controller thus synthesized optimizes a transient performance measure and guarantees consensus within a minimal number of steps. These results are then extended to situations where the networks are described by fixed bidirectional connectivity graphs which are not known at the outset. In these situations, the problem is formulated as a decentralized linear quadratic game, and a linear dynamic feedback scheme involving distributed online optimization is shown to solve the game and achieve a Nash equilibrium. This solution results in finite-time consensus in minimum time, and optimizes the transient behavior on the way to consensus with respect to a quadratic global performance index.

Biography

Supratim Ghosh received his B.Tech in Instrumentation and Control Engineering from National Institute of Technology, Jalandhar, India in 2006 and his M.S. in Electrical Engineering from the Pennsylvania State University in 2010. He is currently pursuing a Ph.D. in Electrical Engineering and an M.A. in Mathematics at Penn State. His research interests include game theory, decentralized control, robust and optimal control, and their applications to problems in economics, power systems, and bio-medicine.