

Fall Seminar Series
Department of Electrical and Computer Engineering
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Zoom Video Conference: <https://temple.zoom.us/j/98475129799>

Distributed Cooperative Systems over Unreliable Networks

Professor Nicola Elia
University of Minnesota Twin Cities

Abstract: This talk focuses on design of networked cooperative systems. These systems have to interact over networks which are often limited in their ability to reliably connect all the nodes. The presence of many unreliable feedback loops greatly affects the performance and limitations of such systems. We first present fundamental communication limits of a large class of feedback systems, as well as limits of feedback stabilization over unreliable communication links. We then consider bottom-up decentralized design approaches and focus on networked systems that cooperate to solve collective optimization problems. We present distributed systems that can solve convex and certain non-convex problems in the presence of unreliable communication links. Application examples include collective target localization from only range measurements, bus-level distributed Optimal Power Flow problems. Finally present some extensions to completely asynchronous cooperative distributed optimization, and design of distributed systems that solve robust optimization problems with application to robust learning.

BIOGRAPHY: Nicola Elia received the Laurea in Electrical Engineering from the Politecnico di Torino, Italy in 1987 and the Ph.D. degree in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology, Cambridge (MA), in 1996. He is currently the Vincentine-Hermes-Luh Chair Professor of Electrical and Computer Engineering at the University of Minnesota (UMN) Twin Cities. Before joining UMN in 2018, and since 1999, he was a faculty with the department of Electrical and Computer Engineering at Iowa State University. He was a Postdoctoral Associate at the Laboratory for Information and Decision Systems, MIT from 1996 to 1999. He was a Control Engineer with the Fiat Research Center, Italy, from 1987 to 1990. Dr. Elia received the NSF Career Award. He is a Fellow of the IEEE. He has written seminal papers on network control and distributed optimization. Prof. Elia's research interests include controller design methods, communication systems with access to feedback, control with communication constraints, distributed optimization and network distributed systems.