Analysis and Control of Network Dynamics

Networked systems, ranging from technological networks (such as communication, data, transportation and power networks) to biological networks (protein interaction networks) to social and economic networks, play an increasingly central role in every aspect of our lives. Many of the key interactions in these networks are inherently dynamic. For example, transportation and power networks need to respond in real-time to changing loads on different links and emerging bottlenecks that may dynamically reconfigure to ensure efficiency and robustness. Existing mathematical analyses of networks mainly focus on static configurations and deterministic dynamics. A new paradigm combining decentralized operations together with real-time, often stochastic, dynamics has been emerging to provide mathematical and conceptual underpinnings for efficient operation, design, and protection of today’s networked systems. This workshop will cover recent advances in this domain.