CS Masters' Thesis Defense

Title: *Exploring Structural Properties and Consensus Performance in Complex Networks*
Speaker: Kejue Jia
Date: Thursday, November 17, 2011
Time: 9:00 a.m.
Location: GMCS 405
Thesis advisor: Dr John Donald

Abstract:
In this paper, I discuss the connection between the structural properties of complex networks and consensus performance. Several experiments are performed to demonstrate how the structural properties and consensus performance change when the size of the network is changing. Three different network models, the square lattice network, the small-world network and the scale-free network, are examined by the experiments. A linear consensus model is adopted in this paper. Simulation results are provided to show theoretical prediction. The result shows that the square lattice network has the highest diameter and average path length and the lowest algebraic connectivity. The small-world network and scale free network has the ability to stabilize their structural properties when the size of the network becomes larger. The consensus simulation shows that the information propagation in square lattice network is substantially inefficient. On the other hand it is significantly efficient in small-world network and scale-free network. One extended experiment shows that adding edges to an existing network can significantly alter its structural characters and consensus convergence pattern.