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# Joint Statistics Seminar

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*The Hong Kong University of Science and Technology*

## Stability of Random Networks

by

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**Date: November 16, 2007 (Friday)**

**Time: 4:00 p.m. - 5:00 p.m.**

**Venue: Room 3416 (Lift 17/18)**

### Abstract

Recently, there has been considerable interest in studying scale free random network. Although the study of real-world networks as graphs goes back some time, recent activity started with the paper of Watts and Strogatz on the "small world phenomenon". Specially, Barabási and Albert proposed a scale-free model and suggested that many real world networks have a power law degree distribution, which is different from the classical random graph introduced by Erdos-Renyi and Gilbert. Since then, the main focus of attention has shifted to the scale-free nature of the random networks. Scientists in different fields study this problem, and many produce empirical and simulative results to support their findings. Yet there are only a few mathematical models to describe the scale free random networks.

In this talk, we shall introduce some notation in random networks, and we also propose a mathematical model to describe the sale-free networks for Barabási-Albert models. The model can be viewed as a graph valued Markov Chain. We proved that there is a stationary power law degree distribution that is independent of their initial conditions. Moreover, we note that the stationary degree distribution only depends on the marginal distributions and the boundary conditions in the random networks, also and that our models have high clustering coefficients. Finally, we found that the 2-dimensional joint distribution had much affect on the clustering coefficients of Barabási-Albert type random networks, and proposed the definition of correlation of Barabási-Albert type random networks. We proved that, it has the high clustering coefficient if the network is positively correlated. We also discuss negative correlation.

This is a joint work with Caifeng DU.

❖ ***All interested are welcome!*** ❖

*For details, please contact ISMT Department.*