



Syllabus

2007 Fall Term

E2909 Complex Network Analysis and Applications (I)

Textbook: Guido Caldarelli, *Scale-Free Networks: Complex Webs in Natural, Technological and Social Sciences*, Oxford University Press, 2005.
[<http://www.oup.com/uk/catalogue/?ci=9780199211517>]

Instructor: Yihjia Tsai

1. Introduction to Graphs
2. Graph Structures
3. Scale-Invariance
4. Power Law Functions
5. Graph Generating Models
6. Networks in the Cell
7. Ecological Networks
8. Geophysical Networks
9. Technological Networks: Internet and WWW
10. Social Networks
11. Financial Networks

Reference:

- Handbook of Graphs and Networks: From the Genome to the Internet, Stefan Bornholdt, Heinz Georg Schuster, eds., Wiley-VCH, Berlin, 2002. ISBN 3527403361.
- Evolution and Structure of the Internet: A Statistical Physics Approach, Romualdo Pastor-Satorras, Alessandro Vespignani, Cambridge University Press, 2004. ISBN 0521826985.
- Power Laws, Scale-Free Networks and Genome Biology, Eugene V. Koonin, Yuri I. Wolf, Georgy P. Karev, eds., Springer, 2006. ISBN 0387258833.
- Statistical Mechanics of Complex Networks, Romualdo Pastor-Satorras, Miguel Rubi, Albert Diaz-Guilera, eds., Springer, 2003. ISBN 3540403728.
- Modeling the Internet and the Web: Probabilistic Methods and Algorithms, Pierre Baldi, Paolo Frasconi, Padhraic Smyth, John Wiley & Sons, 2003. ISBN 0470849061.

Grading: 40% home works + quizzes, 10% attendance, 50% final report