



香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

IE - ITCSC Joint Seminar

Synthesizing Distributed Algorithms for Combinatorial Network Optimization

By

Prof. Minghua Chen

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2:00 pm – 3:00 pm

Rm. 121, Ho Sin Hang Engineering Building, CUHK

Abstract:

Many important network design problems can be formulated as a combinatorial optimization problem. A large number of such problems, however, cannot readily be tackled by distributed algorithms. The Markov approximation framework we presented in this talk is a general technique for synthesizing distributed algorithms. We show that when using the log-sum-exp function to approximate the optimal value of any combinatorial problem, we end up with a solution that can be interpreted as the stationary probability distribution of a class of time reversible Markov chains. Certain carefully designed Markov chains among this class yield distributed algorithms that solve the log-sum-exp approximated combinatorial network optimization problem. From our study in several networking problems, we found Markov approximation technique not only can provide fresh perspective to existing distributed solutions, but also can help us generate new distributed algorithms in various domains with provable performance. We believe the Markov approximation techniques will find application in more network optimization problems, and this talk intends to serve as a tutorial and a call for participation.

This is a joint work with Soung Chang Liew, Ziyu Shao, Caihong Kai, and Shaoquan Zhang, all in Information Engineering Department.

Biography:

Minghua Chen received his B.Eng. and M.S. degrees from the Department of Electronics Engineering at Tsinghua University in 1999 and 2001, respectively. He received his Ph.D. degree from the Department of Electrical Engineering and Computer Sciences at University of California at Berkeley in 2006. He spent one year visiting Microsoft Research Redmond as a Postdoc Researcher. He joined the Department of Information Engineering, the Chinese University of Hong Kong, in 2007, where he currently is an Assistant Professor. His research interests include complex systems (currently focusing on smart grid) and networked systems, distributed and stochastic network optimization and control, multimedia networking, p2p networking, wireless networking, multi-level trust data privacy, secure network coding and network coding for security.

***** ALL ARE WELCOME *****