Rapid mixing of Glauber dynamics via spectral independence for all degrees

Weiming Feng
University of Edinburgh

Time: 11:00AM (Time in Beijing)
15:00PM (Time in Auckland)
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Venue: 518B, Research Building 4
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Abstract: We prove an optimal $\Omega(1/n)$ lower bound on spectral gap of the Glauber dynamics for anti-ferromagnetic two-spin systems with n vertices in the tree uniqueness regime. This spectral gap holds for all, including unbounded, maximum degree Δ. Applications include $O(n^2 \log n)$ mixing time for hardcore model and $O(n^2)$ mixing time for Ising model.

Technique wise, we introduce a new notion called the complete spectral independence, and use a novel Markov chain called the field dynamics to connect complete spectral independence to the rapid mixing of Glauber dynamics for all degrees.

The talk is based on joint the work with Xiaoyu Chen, Yitong Yin and Xinyuan Zhang. The paper will appear in FOCS 2021.

Speaker Bio: Weiming Feng (凤维明) will be a research associate (postdoc) in School of Informatics, University of Edinburgh. He obtained his Ph.D. degree from Nanjing University in June 2021, advised by Professor Yitong Yin. He obtained B.Eng. degree from UESTC in June 2016. His research interest lies in theoretical computer science. Currently, he focuses on sampling and counting algorithms.

Chengdu Algorithms and Logic Seminar is a series of online seminars organized by School of Computer Science and Engineering, University of Electronic Science and Technology of China, and School of Computer Science, University of Auckland that aims to promote collaborations in a broad range of topics in algorithms and logic.

Organizers: Bakhadyr Khoussainov, Jiamou Liu, and Mingyu Xiao
Email: myxiao@gmail.com (Mingyu Xiao)