

THE UNIVERSITY



OF HONG KONG

Department of Mathematics

Numerical Mathematics and Applied Analysis Group Seminar (NMAA)

Algorithms and Worst Case Analyses for Detecting a Singleton Attractor in a Boolean Network Consisting of AND/OR Nodes

Professor Takeyuki TAMURA

Bioinformatics Center, Institute for Chemical Research
Kyoto University, Japan

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Abstract

The Boolean network (BN) is a mathematical model of genetic networks. It is known that detecting a singleton attractor is NP-hard even for AND/OR BNs (i.e., BNs consisting of AND/OR nodes), where singleton attractors correspond to steady states. Though a naive algorithm can detect a singleton attractor for an AND/OR BN in $O(n2^n)$ time, no $O((2 - \varepsilon)^n)$ ($\varepsilon > 0$) time algorithm was known even for an AND/OR BN with non-restricted indegree, where n is the number of nodes in a BN. In the first half of this talk, an $O(1.787^n)$ time algorithm is presented for detecting a singleton attractor of a given AND/OR BN. By further observation, the computational time is improved to $O(1.757^n)$ in the second half.

All are welcome
