



The University of Chicago
Departments of Computer Science,
Mathematics, and Statistics

Scientific and Statistical Computing Seminar

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A Combinatorial Framework for Nonlinear Dynamics

FRIDAY, April 13, 2012, at 3:30 PM
133 Eckhart Hall, 5734 S. University Avenue.

ABSTRACT

Much of the focus of dynamical systems is on the existence and structure of invariant sets. What we have learned over the past century is that this is an extremely rich subject, one need only think of chaotic dynamics and/or bifurcations associated to non uniformly hyperbolic dynamics. However, from the perspective of multiscale applications where one does not have exact models or parameters are poorly known detailed information about invariant sets can, in fact, be misleading.

With this in mind I will describe our efforts to develop a computationally efficient, but mathematically rigorous framework for extracting combinatorial/algebraic topological descriptions of the global dynamical structures of multi-parameter nonlinear systems.

I will demonstrate these ideas in the context of simple models from population biology.

Organizers:

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