

Computing Combinatorial Types of Multi-State Pfaffian Dynamics ^{*}

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In this talk I will present ongoing research which is aimed at creating a logical framework for formal verification of definable dynamical systems. The key idea of this framework is based on computing combinatorial types of trajectories of multi-state dynamical systems. Consider a multi-state dynamics which is a finite family of dynamical systems and state conditions on switches between them. The state space of every dynamical system has a finite partition, and each element of the partition is labelled by a letter of some alphabet. Then every trajectory of the dynamics is naturally labelled by a word in the joint alphabet. This word is called the combinatorial type of the trajectory. In applications it is important to decide whether among a certain family of trajectories there is at least one trajectory of a given type, or whether all the trajectories in this family have the same type. In this talk we propose algorithms for solving such problems for a wide class of multi-state Pfaffian dynamics, which have elementary (doubly-exponential) upper complexity bounds.

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