The dynamics of Boolean networks

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Abstract

Boolean networks are time-discrete dynamical systems over the field with two elements. In biology, they are used frequently to model generegulatory networks, as an alternative to differential equations models. But they are also of great interest as mathematical objects in their own right. A key problem is to relate the Boolean network structure to its dynamics. Approaches from combinatorics and computational algebra have been used successfully for this purpose. Another problem is to identify classes of Boolean networks for which this problem can be solved partially or completely. This talk will provide an overview of some known results and present open problems. It is accessible to advanced undergraduate majors.

Keywords: network, dynamical system, combinatorics, commutative algebra.