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Modelling spatial patterns with Boolean networks

Abstract:

Cellular automata provide a useful framework for the investigation of fundamental mechanisms underlying pattern formation. For instance, lattice-gas cellular automata are used to study Turing instabilities in a discrete-setting. The formation of fine-grained patterns can be explained with simple Boolean models for lateral inhibition; characterisations of the trap spaces allow the investigation of reachability properties and robustness of patterns to perturbations. We consider generalisations of the lateral inhibition models that combine local activation and inhibition and can display longer range patterns.