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Wavefront cellular learning automata

Chaos **28**, 021101 (2018); <https://doi.org/10.1063/1.5017852>Behnaz Moradabadi^{a)} and Mohammad Reza Meybodi^{b)}[View Affiliations](#)[Keywords](#)[Keywords](#)

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ABSTRACT

This paper proposes a new cellular learning automaton, called a wavefront cellular learning automaton (WCLA). The proposed WCLA has a set of learning automata mapped to a connected structure and uses this structure to propagate the state changes of the learning automata over the structure using waves. In the WCLA, after one learning automaton chooses its action, if this chosen action is different from the previous action, it can send a wave to its neighbors and activate them. Each neighbor receiving the wave is activated and must choose a new action. This structure for the WCLA is necessary in many dynamic areas such as social networks, computer networks, grid computing, and web mining. In this paper, we introduce the WCLA framework as an optimization tool with diffusion capability, study its behavior over time using ordinary differential equation solutions, and present its accuracy using expediency analysis. To show the superiority of the proposed WCLA, we compare the proposed method with some other types of cellular learning automata using two benchmark problems.



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