MR3535157 37B15 37A25 60J05

Marcovici, Irène (F-LOR2-IEC)

★Ergodicity of noisy cellular automata: the coupling method and beyond. (English summary)

Pursuit of the universal, 153–163, *Lecture Notes in Comput. Sci.*, 9709, *Springer*, [*Cham*], 2016.

Consider a set of cells indexed by $\mathbb{Z}$ and a finite symbol set S. A cellular automaton is a dynamical system which acts locally and synchronously on the configuration space $S^{\mathbb{Z}}$. When the updates are random we obtain a probabilistic cellular automaton: at each time step the new content of each cell is randomly chosen, independently of the others, according to a distribution given by the states in a finite neighbourhood of the cell. Examples are provided by noisy cellular automata, for which the updates are governed by a deterministic rule, which is perturbed by errors with a positive probability.

A probabilistic cellular automaton is said to be ergodic if it forgets its initial condition, meaning that is has a unique and attractive invariant measure. In the high noise regime, ergodicity of a cellular automaton can be shown by the coupling method. For small noise, however, ergodicity is usually very difficult to establish.

In the article under review, the author presents an overview of her work on several extensions of the coupling method to small noises for probabilistic cellular automata that have some further specific properties. The coupling method for high noise is first presented. Then, three families of cellular automata (hardcore, nilpotent and permutive cellular automata) are described, and some specific tools are devised to prove ergodicity in all these cases. This is achieved in the last three propositions of this interesting article.

{For the collection containing this paper see MR3535179}

Vladimir García-Morales