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A Characterization of Cellular Automata Generated by Idempotents on the Full Shift

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In this article, we discuss the family of cellular automata generated by so-called idempotent cellular automata (CA G such that G^2 = G) on the full shift. We prove a characterization of products of idempotent CA, and show examples of CA which are not easy to directly decompose into a product of idempotents, but which are trivially seen to satisfy the conditions of the characterization. Our proof uses ideas similar to those used in the well-known Embedding Theorem and Lower Entropy Factor Theorem in symbolic dynamics. We also consider some natural decidability questions for the class of products of idempotent CA.

Submission history

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