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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 socalled 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.

Comments: will be presented in CSR 2012 Subjects: Dynamical Systems (math.DS); Formal Languages and Automata Theory (cs.FL) Cite as: arXiv:1206.0585 [math.DS] (or arXiv:1206.0585v1 [math.DS] for this version)

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