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Looking for pre-expansivity in two-dimensional cellular automata

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In [3] we have introduced the notion of pre-expansivity for cellular automata (CA): it is the property of being positively expansive on asymptotic pairs of configurations (i.e. configurations that differ in only finitely many positions). Pre-expansivity therefore lies between positive expansivity and pre-injectivity, two important notions of CA theory. It is known [5] that expansivity is impossible in two-dimensional CA, but the proof does not apply to the weaker notion of pre-expansivity. Thus we are in the quest for two-imensional pre-expansive CA. In [3] we showed however that no two-dimensional Abelian CA can be pre- expansive, thus non-linear CAs are our only hope. In this direction, we started by exploring the famillly of multiplication CA, which is a non-linear CA that resulted to be pre-expansive in dimension one [3]. Then we extended its definition to two-dimensional CAs [2], with surprising experimental results, but very evasive theoretical results. In this talk, we will show our findings, iin order to motivate new people in the study of these automatons, and receive inspiring ideas.

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