Decidability of the isomorphism problem between constant-shape substitutions

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Abstract.

An important question in dynamical systems is the classification, i.e., to be able to distinguish two isomorphic dynamical systems. In this work, we focus on the family of multidimensional substitutive subshifts. Constant-shape substitutions are a multidimensional generalization of constant-length substitutions, where any letter is assigned a pattern with the same shape. Since they are defined by finite data it is natural to ask about the decidability of the isomorphism problem. We prove that in this class of substitutive subshifts, under the hypothesis of having the same structure, it is decidable whether there exists a factor map between two aperiodic minimal substitutive subshifts. The strategy followed in this work consists in giving a complete description of the factor maps between these substitutive subshifts. We then show some consequences on coalescence, automorphism group and number of symbolic factors. Joint work with Julien Leroy.