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Substitutive structures on general countable groups

Abstract: Symbolic dynamics has been largely used to represent dynamical systems through a coding system. This method was initially developed by M. Morse and G. A. Hedlund. One commonly used coding method involves infinite sequences of morphisms defined on finitely generated monoids, known as directive sequences or $\mathcal{S}$-adic representations. Recent research has shown that understanding the underlying $\mathcal{S}$-adic structures of some subshifts is valuable for studying their dynamical properties. Considering the previous studies and acknowledging the effectiveness of the $\mathcal{S}$-adic framework, it is natural to ask whether this setting is useful beyond the one-dimensional case. In 2023, the notion of constant-shape substitutions was introduced, as a multidimensional analogue for constant-length substitutions, marking a first attempt to study multidimensional substitutions in a broader class than those defined solely by rectangular and square supports. In this talk we are going to discuss a way to define in a general way an analogue of constant-shape substitutions for general countable group actions. The geometry of these groups is an important feature to consider. We are going to present some new dynamical properties about them, and discuss how to obtain other representations. This is a joint work with N. Bitar and P. Guillon.