



Shigeki Akiyama, Pierre Arnoux (Eds.)

# Substitution and Tiling Dynamics: Introduction to Self-inducing Structures

CIRM Jean-Morlet Chair, Fall 2017

Series: Lecture Notes in Mathematics

- Features beautifully illustrated lectures on self-inducing structures with cutting-edge results related to substitutions and tilings
- Provides an easy introduction to  $S$ -adic systems and self-affine tilings
- Includes chapters on games and undecidability questions and on the spectrum of substitution tilings

This book presents a panorama of recent developments in the theory of tilings and related dynamical systems. It contains an expanded version of courses given in 2017 at the research school associated with the Jean-Morlet chair program. Tilings have been designed, used and studied for centuries in various contexts. This field grew significantly after the discovery of aperiodic self-similar tilings in the 60s, linked to the proof of the undecidability of the Domino problem, and was driven further by Dan Shechtman's discovery of quasicrystals in 1984. Tiling problems establish a bridge between the mutually influential fields of geometry, dynamical systems, aperiodic order, computer science, number theory, algebra and logic. The main properties of tiling dynamical systems are covered, with expositions on recent results in self-similarity (and its generalizations, fusion rules and  $S$ -adic systems), algebraic developments connected to physics, games and undecidability questions, and the spectrum of substitution tilings.

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