

Piecewise Affine Functions, Sturmian Sequences and Aperiodic Tilings

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We discuss constructions of Wang tilings that simulate iterations of piecewise rational affine functions. Our method uses elementary algebra and representations of real numbers as Sturmian sequences. The method provides small aperiodic Wang tile sets, and leads to a simple proof of the undecidability of the domino problem. One also easily establishes analogous undecidability results about tilings on the hyperbolic plane and on Baumslag–Solitar groups.
