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Chaotic Delone sets. (English) Zbl 07356220
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The paper deals with chaotic Delone sets. The set $S$ is a Delone set in the space $X$ if there exists $\varepsilon, \delta$ such that for every $x \in X$ there is $y \in S$ with $d(x, y) < \varepsilon$, and $d(x, y) \geq \delta$ for every $x \neq y \in S$.

There exists a natural, compact, metrizable topology on the set $D_{\delta, \varepsilon}$ of Delone sets which makes the following action of $\mathbb{R}^n$ continuous: $v.S = S - v$. Thus we have a dynamical system and the question is if this group action is chaotic. Here $S$ is said to be chaotic if $S$ is aperiodic and the union of periodic orbits is dense in the adherence of the orbit of $S$.

Recall that a property is generic if it holds on a residual subset, i.e., a subset containing a countable intersection of open dense sets. The first theorem of the paper shows that being chaotic is a generic property if $\varepsilon \geq \delta$.

In the second part of the paper the authors explain how to construct a chaotic Delone set in the hyperbolic plane as a cut and project set and provide its characterization. It is worth to notice that this construction can be generalized to any dimension.

Reviewer: Nicolas Bédaride (Marseille)

MSC:

37D45 Strange attractors, chaotic dynamics of systems with hyperbolic behavior
37B05 Dynamical systems involving transformations and group actions with special properties (minimality, distality, proximality, expansivity, etc.)
52C23 Quasicrystals and aperiodic tilings in discrete geometry
37B52 Tiling dynamics

Keywords:
Delone set; chaos; tiling; foliated space; hyperbolic dynamical system; geodesic flow

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References:


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