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by

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PERIODIC POINTS OF SOLENOIDAL AUTOMORPHISMS

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ABSTRACT. We give a characterization of the sets of periodic points of toral automorphisms. Then we describe the one-dimensional solenoids as the quotients of the (additive) group of adeles and characterize the sets of periodic points of automorphisms on these solenoids. We also determine the sets of periodic points for automorphisms on a full solenoid.

1. Introduction

A *dynamical system* is by definition a pair (X, f), where X is a topological space and f is a continuous map of X. A point $x \in X$ is said to be *periodic* if there is an $n \in \mathbb{N}$ such that $f^n(x) = x$; any such n is called a *period* of x and the least among them is called the *least period* of x. A well-studied problem on the periodicity is the characterization of sets of least periods and periodic points of a family of dynamical systems. To put formally, we seek the following. If $\mathcal{F}$ is a family of maps on a space X, then give a characterization of the collections $\{Per(f) : f \in \mathcal{F}\}$ and $\{P(f) : f \in \mathcal{F}\}$, where $Per(f) = \{n \in \mathbb{N} : f$ has a periodic point of least period $n\}$ and $P(f) = \{x \in X : x$ is a periodic point of $f\}$. The papers [1], [5], [6], [9], [13], [15] give such characterizations for various families, and for a nice survey on the characterization of the sets of least periods, see [8]. On the other hand, [12] gives the number of periodic points of any given period for some continuous homomorphisms of a solenoid.

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