Periodicity of solenoidal automorphisms

Faiz Imam[1], Sharan Gopal*

mefaizy@gmail.com,
sharanraghu@gmail.com

Characterization of the sets of periodic points of a family of dynamical systems is a well studied problem in the literature. Here, we consider this problem for the family of automorphisms on a solenoid. By definition, a solenoid Σ is a compact connected finite dimensional abelian group. Equivalently, a topological group Σ will be a solenoid if its Pontryagin dual $\widehat{\Sigma}$ is a subgroup of $\mathbb{Q}^n$ and also contains $\mathbb{Z}^n$ as a subgroup for some positive integer n. When the dual is equal to $\mathbb{Z}^n$, the solenoid is actually an n-dimensional torus, while its known as a full solenoid when the dual is $\mathbb{Q}^n$. Previously the characterization has been done on n-dimensional torus, full solenoids and also for the alternate description by considering a one-dimensional solenoid as the inverse limit of a sequence of maps on unit circle.

This talk is based upon a pre-print, related to our recent work about the extension of periodic point characterization to n-dimensional solenoids, whose duals are subgroups of algebraic number fields. Here, we used the theory of adeles for describing a solenoid and the periodic points of its automorphisms. The ring of adeles $\mathbb{A}_{\mathbb{K}}$ of an algebraic number field $\mathbb{K}$, is the restricted product of $\mathbb{K}_v$'s with respect to $\Re_v$'s, where $\mathbb{K}_v$ is the completion of $\mathbb{K}$ with respect to a place v and $\Re_v$ is an open, unique maximal compact subring of $\mathbb{K}_v$.

[1]Both the authors thank SERB-DST, Govt. of India for financial support.