

1100-37-216

Viorel Nitica* (vnitica@wcupa.edu), Department of Mathematics, West Chester University, 25 University Avenue, West Chester, PA 19383, and **Andrew Torok** (torok@math.uh.edu), Department of Mathematics, University of Houston, Houston, TX. *Stable topological transitivity of Heisenberg group extensions of hyperbolic systems.*

We consider skew-extensions with fiber the real Heisenberg group of a uniformly hyperbolic dynamical system.

We show that among the C^r extensions ($r > 0$) that avoid an obvious obstruction, topological transitivity is an open and dense property. We show that a Heisenberg extension is transitive if and only if the abelian extension given by the abelianization of the Heisenberg group is transitive.

A new tool that we introduce, of independent interest, is a diophantine approximation result. We show, under general conditions, the existence of an infinite set of approximate positive integer solutions for a diophantine system consisting of a quadratic indefinite form and several linear equations. The set of approximate solutions can be chosen to point in a certain direction. The direction can be chosen from a residual subset of full measure of the set of real directions solving the system of equations exactly.

Another contribution, which is used in the proof of the main result, but it is also of independent interest, is the solution of the so called semigroup problem for the Heisenberg group. We show that for a subset S of the Heisenberg group, that avoids any maximal semigroup with non-empty interior, the closure of the semigroup generated by S is actually a group. (Received February 08, 2014)