HOMOCLINIC POINTS, HAUSDORFF DIMENSION, AND A THEOREM OF GONCHENKO, SILNIKOV, AND TURAEV

SHELDON NEWHOUSE

MICHIGAN STATE UNIVERSITY

ABSTRACT. This talk is dedicated to the memory of L. P. Silnikov. A C^r surface diffeomorphism f has *persistent homoclinic tangencies* if there is an invariant hyperbolic set which has homoclinic tangencies and this property holds when f is perturbed in the C^r topology (here $2 \leq r \leq \infty$). The study of residual subsets of such diffeomorphisms produces many interesting phenomena. Among these are topologically transitive sets of maximal Hausdorff dimension, infinitely many sinks, arbitrary growth rates of periodic orbits (Kaloshin), non-existence of symbolic extensions, etc. Many of these results are consequences of a deep theorem of Gonchenko, Silnikov, and Turaev. We discuss various aspects of these results, including some recent advances and open problems.