Jimmy Tseng

Simultaneous dense and nondense orbits

Abstract:
We consider pairs of maps on (usually) the same phase space and, in particular, examine pairs for which many points have drastically different orbit structures. Our main example is a pair of commuting automorphisms of the d-torus, for which the set of points with dense orbit under one map and nondense orbit under the other has full Hausdorff dimension.

Two other examples that we only very briefly mention are two linearly independent elements of the Cartan action on compact higher rank homogeneous spaces and the multiplication-by-n map on the circle and the geodesic flow under the induced map on the circle corresponding to the expanding horospherical subgroup. The last result is an example for which the phase spaces are not the same (because the geodesic flow acts on the space of unimodular lattices) but, nevertheless, it allows us to obtain a counterpart to a classical result of R. Kaufmann in Diophantine approximation.

This talk is based on my joint work with V. Bergelson and M. Einsiedler and my other recent joint work with R. Shi.