

Transport in Chaotic Dynamical Systems

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Abstract:

The dynamics of conservative system is often a complex mixture of regular and chaotic regions. The goal of a theory of transport is compute the rates at which orbits move through the chaotic zones. Ideally, one would like to treat chaos as equivalent to randomness. However, in low-dimensional systems, transport rates are strongly influenced by partial barriers due to stable and unstable manifolds. We will present a number of examples of chaos, using two and three-dimensional mappings and show the partial barriers give rise to long-time correlations. A complete understanding of even the simplest of these systems remains a challenging problem.