

Abstract

Cohomological equations for area-preserving flows were solved by G.Forni and the equations for IETs were treated by Marmi-Moussa-Yoccoz. In our work, we study the cohomological equation for smooth locally Hamiltonian flows on compact surfaces by considering new invariant distributions that did not appear in the previous two settings.

Our main theorem states that the regularity of the solution depends not only on the vanishing of the so-called Forni's distributions but also on the vanishing of a family of new invariant distributions reflecting the behavior around the saddles. This result will provide the main ingredient for a complete solution to the regularity problem for almost all locally Hamiltonian flows. This is joint work with Krzysztof Frączek.