SEMINARIO DE MATEMÁTICAS

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Symmetric Liapunov center theorem

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Abstract

The aim of my lecture is to present the development of the symmetric Liapunov center theorem during the last five years.

Let $\Omega \subset \mathbb{R}^n$ be an open and invariant subset of an orthogonal representation $\mathbb{R}^n$ of a compact Lie group Γ and $U : \Omega \to \mathbb{R}$ be a Γ-invariant potential of the class C^2. If $\Gamma(q_0) \subset \Omega \cap (U')^{-1}(0)$ is a non-degenerate or isolated minimal orbit of critical points of U. Moreover assume that either the group of symmetries Γ is abelian or the isotropy group $\Gamma_{q_0} = \{\gamma \in \Gamma : \gamma q_0 = q_0\}$ is isomorphic to a finite-dimensional torus. Then if there is at least one positive eigenvalue of the Hessian $U''(q_0)$ then in any neighborhood of the orbit $\Gamma(q_0)$ there is a periodic orbit of non-stationary solutions of system $\ddot{q}(t) = -U'(q(t))$. Moreover, we estimate the minimal period of these solutions.

The basic idea of the proof is to apply the infinite-dimensional version of the equivariant Conley index theory.

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