Nonlinear Dynamics and Systems Theory, **10** (4) (2010) 339–348

Homoclinic Orbits for Superquadratic Hamiltonian Systems with Small Forcing Terms

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Received: December 3, 2009; Revised: October 18, 2010

Abstract: In this paper, we prove the existence of homoclinic orbits for the second order Hamiltonian system: $\ddot{q}(t) + \nabla V(t, q(t)) = f(t)$, where $V \in C^1(\mathbb{R} \times \mathbb{R}^n, \mathbb{R}), V(t, q) = -K(t, q) + W(t, q)$ is T-periodic in t, K satisfies the "pinching" condition $b_1|q|^2 \leq K(t, q) \leq b_2|q|^2$ and W is superquadratic at the infinity and needs not satisfy the global Ambrosetti-Rabinowitz condition. A homoclinic orbit is obtained as the limit of $2kT$-periodic solutions of a certain sequence of second order differential equations.

Keywords: *homoclinic orbit; Hamiltonian system; Mountain Pass Theorem.*

Mathematics Subject Classification (2000): 34C37, 37J45, 70H05.