Homoclinic solutions for a class of the second order Hamiltonian systems. (English)

Summary: We study the existence of homoclinic orbits for the second-order Hamiltonian system \( \ddot{q} + V_q(t,q) = f(t) \), where \( q \in \mathbb{R}^n \) and \( V \in C^1(\mathbb{R} \times \mathbb{R}^n, \mathbb{R}) \), and \( V(t,q) = -K(t,q) + W(t,q) \) is \( T \)-periodic in \( t \). A map \( K \) satisfies the “pinching” condition \( b_1|q|^2 \leq K(t,q) \leq b_2|q|^2 \), \( W \) is superlinear at infinity and \( f \) is sufficiently small in \( L^2(\mathbb{R}, \mathbb{R}^n) \). A homoclinic orbit is obtained as a limit of \( 2kT \)-periodic solutions of a certain sequence of the second-order differential equations.

MSC:

37J45 Periodic, homoclinic and heteroclinic orbits; variational methods, degree-theoretic methods (MSC2010)
58E05 Abstract critical point theory (Morse theory, Lyusternik-Shnirel’man theory, etc.) in infinite-dimensional spaces
34C37 Homoclinic and heteroclinic solutions to ordinary differential equations
70H05 Hamilton’s equations

Keywords:
homoclinic orbit; Hamiltonian system; critical point; periodic solutions

Full Text: DOI

References:

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Cited in 172 Documents

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