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Existence of infinitely many homoclinic orbits in Hamiltonian systems. (English)

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Math. Z. 209, No. 1, 27-42 (1992).

We consider a Hamiltonian system in $\mathbb{R}^{2N}$, $z' = J\nabla_z H(t,z)$, H being 1-periodic in time, and 0 being a hyperbolic rest point. Under global assumptions on H, we prove that there are always infinitely many orbits homoclinic to 0, i.e. such that $z(\pm\infty) = 0$. Those orbits are geometrically distinct, in the following sense:

$$(x, y \text{ are geometrically distinct}), \quad \Leftrightarrow \quad (\forall n \in \mathbb{Z} : \ x(.) \neq y(. - n)).$$

The approach we use here is variational, and no transversality hypothesis is needed.

Reviewer: E.Séré (Paris)

MSC:

37J99 Dynamical aspects of finite-dimensional Hamiltonian and Lagrangian systems

Cited in **4** Reviews
Cited in **118** Documents

Keywords:

Hamiltonian systems; homoclinic orbits; chaos; variational problems; Palais-Smale condition; concentration-compactness

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