Gallavotti, Giovanni

A criterion of integrability for perturbed nonresonant harmonic oscillators. "Wick Ordering" of the perturbations in classical mechanics and invariance of the frequency spectrum.
(English) Zbl 0544.70026
Commun. Math. Phys. 87, 365-383 (1982).

The paper studies perturbations of integrable Hamiltonian systems of n degree of freedom. The results pertain to the famous theorem of Poincaré on the generic nonexistence of analytic integrals for perturbed Hamiltonians. The author introduces the notion of "renormalization" in this setting. Among other results he proves the following. There is at most one renormalization of the perturbed Hamiltonian which is canonically analytically conjugate to the unperturbed one. He also gives a criterion for the existence of such renormalization.

Reviewer: E.Gutkin

MSC:

70H05 Hamilton's equations
37J35 Completely integrable finite-dimensional Hamiltonian systems, integration methods, integrability tests
37K10 Completely integrable infinite-dimensional Hamiltonian and Lagrangian systems, integration methods, integrability tests, integrable hierarchies (KdV, KP, Toda, etc.)

Keywords:

Wick ordering; invariance of the frequency spectrum; perturbations of integrable Hamiltonian systems; n degree of freedom; theorem of Poincaré; generic nonexistence of analytic integrals; renormalization

Full Text: DOI

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