Mathematics > Dynamical Systems

Response solutions for arbitrary quasi-periodic perturbations with Bryuno frequency vector

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We study the problem of existence of response solutions for a real-analytic one-dimensional system, consisting of a rotator subjected to a small quasi-periodic forcing. We prove that at least one response solution always exists, without any assumption on the forcing besides smallness and analyticity. This strengthens the results available in the literature, where generic non-degeneracy conditions are assumed. The proof is based on a diagrammatic formalism and relies on renormalisation group techniques, which exploit the formal analogy with problems of quantum field theory; a crucial role is played by remarkable identities between classes of diagrams.

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