Symmetric periodic solutions of symmetric Hamiltonians in 1:1 resonance

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Abstract

The aim of this work is to prove analytically the existence of symmetric periodic solutions of the family of Hamiltonian systems with Hamiltonian function H(q_1,q_2,p_1,p_2)= 1/2(q_1^2+p_1^2)+1/2(q_2^2+p_2^2)+ a q_1^4+b q_1^2q_2^2+c \q_2^4 with three real parameters a, b and c. Moreover, we characterize the stability of these periodic solutions as function of the parameters. Also, we find a first-order analytical approach of these symmetric periodic solutions. We emphasize that these families of periodic solutions are different from those that exist in the literature.

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