

Normally Stable Hamiltonian Systems

by

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Abstract:

We study the stability of an equilibrium point of a Hamiltonian system with n degrees of freedom. A new concept of stability called normal stability is given which applies to a system in normal form and relies on the existence of a formal integral whose quadratic part is positive definite. We give a necessary and sufficient condition for normal stability. This condition depends only on the quadratic terms of the Hamiltonian. We relate normal stability with formal stability and Liapunov stability. An application to the stability of the L_4 equilibrium point of the spatial circular restricted three body problem is given.