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Título: Introduction To Hamiltonian Dynamical Systems And The N-Body Problem

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Sinopsis

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This text grew out of graduate level courses in mathematics, engineering and physics given at several universities. The courses took students who had some background in differential equations and lead them through a systematic grounding in the theory of Hamiltonian mechanics from a dynamical systems point of view. Topics covered include a detailed discussion of linear Hamiltonian systems, an introduction to variational calculus and the Maslov index, the basics of the symplectic group, an introduction to reduction, applications of Poincaré's continuation to periodic solutions, the use of normal forms, applications of fixed point theorems and KAM theory. There is a special chapter devoted to finding symmetric periodic solutions by calculus of variations methods.

The main examples treated in this text are the N-body problem and various specialized problems like the restricted three-body problem. The theory of the N-body problem is used to illustrate the general theory. Some of the topics covered are the classical integrals and reduction, central configurations, the existence of periodic solutions by continuation and variational methods, stability and instability of the Lagrange triangular point.