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Complex hamiltonian dynamics

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Abstrak

This book introduces and explores modern developments in the well established field of Hamiltonian dynamical systems. It focuses on high degree-of-freedom systems and the transitional regimes between regular and chaotic motion. The role of nonlinear normal modes is highlighted and the importance of low-dimensional tori in the resolution of the famous FPU paradox is emphasized. Novel powerful numerical methods are used to study localization phenomena and distinguish order from strongly and weakly chaotic regimes. The emerging hierarchy of complex structures in such regimes gives rise to particularly long-lived patterns and phenomena called quasi-stationary states, which are explored in particular in the concrete setting of one-dimensional Hamiltonian lattices and physical applications in condensed matter systems.