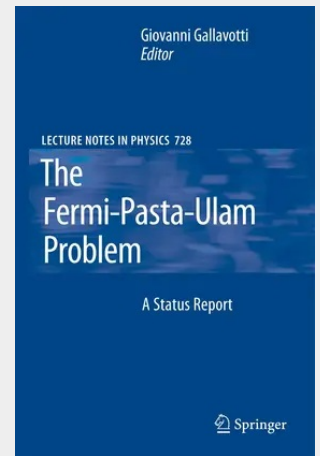


The Fermi-Pasta-Ulam Problem

A Status Report

The apparent contradiction of the results of the Fermi-Pasta-Ulam experiment conducted in 1953 and 1954 with the hypothesis that essentially any nonlinearity would lead to a system exhibiting ergodic behaviour has become known as the Fermi-Pasta-Ulam Problem. This volume reviews the current understanding of this paradox without trying to force coherence on differing perspectives on the same problem by various groups or approaches. The contributions comprise studies of one-dimensional chains, descriptions of numerical methods, heuristic theories, addressing the "long standing and controversial problem of distinguishing chaos from noise in signal analysis," metastability, the relation of the FPU motions with the integrable equations, approaches using methods of perturbation theory and the proof of the applicability of KAM theory in FPU chains with energy very close to a minimum. For the convenience of the reader the original work of FPU is reprinted in an appendix. The order of the contributions reflects the aim of leading the interested but inexperienced reader through gradual understanding, starting from general analysis, and proceeding towards more specialized topics.

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