

Thermalization of Weakly Nonintegrable FPUT and Toda Dynamics: A Lyapunov Spectrum Perspective

Sergej Flach¹

¹Institute For Basic Science, Daejeon, South Korea

We study the thermalization slowing down of Fermi-Past-Ulam-Tsingou (FPUT) chains and of Toda chains with nonintegrable boundaries. We focus on the transition from FPUT to harmonic chains, from FPUT to Toda chains with fixed boundaries, and from nonintegrable open boundary Toda to integrable fixed boundary Toda. We compute the Lyapunov spectrum and analyze its scaling properties upon approaching integrable limits. We analyze the scaling of the largest Lyapunov exponent, the rescaled Lyapunov spectrum, and the Kolmogorov-Sinai entropy. Using additional analytic arguments we demonstrate evidence that all three cases are operating in the regime of a Long Range Network of nonintegrable perturbations.