Nonlinear Sciences > Chaotic Dynamics

Thermostatistics in the neighborhood of the π-mode solution for the Fermi-Pasta-Ulam β system: from weak to strong chaos

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We consider a π-mode solution of the Fermi-Pasta-Ulam β system. By perturbing it, we study the system as a function of the energy density from a regime where the solution is stable to a regime, where is unstable, first weakly and then strongly chaotic. We introduce, as indicator of stochasticity, the ratio ρ (when is defined) between the second and the first moment of a given probability distribution. We will show numerically that the transition between weak and strong chaos can be interpreted as the symmetry breaking of a set of suitable dynamical variables. Moreover, we show that in the region of weak chaos there is numerical evidence that the thermostatistic is governed by the Tsallis distribution.

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