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From local to global ergodicity: An algebraic approach

Abstract: Through the model of N (≥ 2) hard balls with masses $m_1, \dots, m_N$ and radius r moving in the flat torus $\mathbf{T}^\nu_L = \mathbf{R}^\nu / L \cdot \mathbf{Z}^\nu$ of size L ($\nu \geq 3$) we show how an earlier algebraic approach (developed by D. Szasz and myself a few years ago) generalizes to produce a proof for the hard passage from local to global ergodicity in certain non-uniformly hyperbolic, algebraic dynamical systems with singularities. We prove the ergodicity (actually, the Bernoulli mixing property) of such systems for almost every selection $(m_1, \dots, m_N; L)$ of the outer geometric parameters. This theorem complements an earlier result of mine that proved the same, almost sure ergodicity in the case $\nu = 2$. However, the method of that proof was primarily dynamic-geometric, whereas the present approach is inherently algebraic.