ZERO-TEMPERATURE LIMIT OF THE ABC MODEL WITH NON EQUAL DENSITIES

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Resumo/Abstract:
The *ABC model* is a conservative stochastic dynamics consisting of three species of particles, labeled A, B, C, on a discrete ring $\{-N, \ldots, N\}$ (one particle per site). The system evolves by nearest neighbor transpositions: $AB \to BA$, $BC \to CB$, $CA \to AC$ with rate $q < 1$ and $BA \to AB$, $CB \to BC$, $AC \to CA$ with rate 1. We consider the general (non-reversible) case, where the quantities of particles of each type are not necessarily equal. We investigate a *strongly asymmetric* regime, the zero-temperature limit, where $q = e^{-\beta}$, $\beta \uparrow \infty$. The main result asserts that the particles almost always form three pure domains (one of each species) and that, as the system size N grows with β, this segregated shape evolves (in a proper time scale) as a Brownian motion on the circle, which may have a drift.