Ergodicity of The KPZ Fixed Point

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Abstract:
The Kardar-Parisi-Zhang (KPZ) fixed point is a Markov process $(h_t\,,\, t \geq 0)$ on the space of upper-semicontinuous functions that is conjectured to be at the core of the KPZ universality class. Our main result is that, for suitable initial conditions, $h_t(x) - h_t(0)$ converges in distribution, as $t \to \infty$, to a two-sided Brownian motion with zero drift and diffusion coefficient 2. The heart of the proof is the coupling method constructed through the variational formulation of the KPZ fixed point.