Weak convergence of measure-valued processes and \( r \)-point functions

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March 8, 2006

Abstract: We prove a sufficient set of conditions for a sequence of finite measures on the space of cadlag measure-valued paths to converge to the canonical measure of super-Brownian motion in the sense of convergence of finite-dimensional distributions. The conditions are convergence of the Fourier transform of the \( r \)-point functions and perhaps convergence of the “survival probabilities”. These conditions have recently shown to be satisfied for a variety of statistical mechanical models including critical oriented percolation, the critical contact process, and lattice trees at criticality, all above their respective critical dimensions.

Keywords: \( r \)-point functions, measure-valued processes, super-Brownian motion, canonical measure, critical oriented percolation

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