

Stochastic partial differential equations and applications

From Interacting Particle Systems to SDE's

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We present a connection between Interacting Particle Systems and Stochastic Differential Equations via the fluctuations of the empirical measure. More precisely, the Central Limit Theorem for the local density of particles in the Symmetric Simple Exclusion Process in contact with reservoirs. In this model, particles evolve on the bulk according to nearest neighbour random walks, and injection/removal of particles happen at the first and last sites. The study of the collective behaviour of particles is of central importance in IPS, and the main goal of this talk is to present how one can derive SDE's from microscopic systems, and the typical technical difficulties that arise.