FROM PARTICLE SYSTEMS TO REACTION-DIFFUSION EQUATIONS

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Abstract

In this talk I will present the construction of a family of particle systems that converge after scaling to the solution of a non-linear SDE of Reaction-Diffusion type. More precisely: fix a finite set V, we can construct a family of particle systems that converge after scaling to a solution of the following Stochastic Differential Equation (SDE):

$$\begin{cases} d\zeta_t(x) = \Big[\Delta_V \zeta_t(x) - \beta\big(\zeta_t(x)\big)^k\Big]dt + \sqrt{\alpha\big(\zeta_t(x)\big)^\ell}\, dB_t^x \\ \zeta_0(x) = \rho_0(x) \end{cases}$$

where k, ℓ are positive integers and α, β are positive real numbers.