

第13回早稲田大学 数学・応用数理談話会

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アクセス：<https://www.waseda.jp/top/access/nishiwaseda-campus>



題目： The stochastic mass conserved Allen-Cahn equation with nonlinear diffusion

Abstract

In this talk, we study the initial boundary value problem for a stochastic nonlocal mass conserved Allen-Cahn equation in an open bounded domain of \mathbb{R}^n with a smooth boundary, in the case of a rather general nonlinear elliptic operator. We suppose that the noise is induced by a Q-Brownian motion.

The deterministic problem in the case of linear diffusion was introduced by Rubinstein and Sternberg as a model for phase separation in a binary mixture, and the well-posedness and the stabilization of the solution for large times were proved by Boussaïd, Hilhorst and Nguyen.

A singular limit of the stochastic problem with a small parameter and linear diffusion has been studied by Antonopoulou, Bates, Blömker and Karali to model the motion of a droplet. In this talk, we prove the existence and uniqueness of the weak solution, which had remained an open problem even in the linear diffusion case studied by these four authors.

The first step is to perform a change of unknown function, which involves the solution of the corresponding stochastic heat equation with nonlinear diffusion.

Taking inspiration from articles by Marion and Krylov and Rozovskii, we apply a Galerkin method, and search for suitable a priori estimates. We deduce that the approximate solution weakly converges along subsequences. The main problem is to identify the limit of the nonlinear terms, which we do by means of the monotonicity method. We also prove the uniqueness of the weak solution.

This is joint work with P. El Kettani and K. Lee.

講演者

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