Stochastic Webinar

Stochastic wave equations with constraints: well-posedness and Smoluchowski-Kramers approximation

Sandra Cerrai University of Maryland

Sandra Cerrai got her Ph.D. in Mathematics at the Scuola Normale Superiore of Pisa in 1998, under the supervision of Giuseppe Da Prato. She became an assistant professor at the University of Florence in 1995 and in 2001 she was promoted to associate professor. In 2008 she moved to the University of Maryland, College Park, where in 2012 she became a full professor. She studies the asymptotic behavior of systems that possess multiple scales and are described by stochastic partial differential equations.

Abstract: We investigate the well-posedness of a class of stochastic second-order in time-damped evolution equations in Hilbert spaces, subject to the constraint that the solution lies within the unitary sphere. Then, we focus on a specific example, the stochastic damped wave equation in a bounded domain of a d-dimensional Euclidean space, endowed with the Dirichlet boundary condition, with the added constraint that the L^2-norm of the solution is equal to one. We introduce a small mass $\mu>0$ in front of the second-order derivative in time and examine the validity of a Smoluchowski-Kramers diffusion approximation. We demonstrate that, in the small mass limit, the solution converges to the solution of a stochastic parabolic equation subject to the same constraint. We further show that an extra noise-induced drift emerges, which in fact does not account for the Stratonovich-to-Itô correction term. This is joint work with Zdzislaw Brzeźniak.

讲座时间：

2023.4.5 周三 上午10：00-11：00

会议地点：ZOOM会议室 会议ID：354 143 7366 密码：123456

主办单位：
中科院数学与系统科学研究院应用数学所
北京理工大学数学与统计学院