Einladung

Würzburger Mathematisches Kolloquium

Julius-Maximilians-Universität Würzburg • Institut für Mathematik

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Homogenization of a Multivariate Diffusion with Semipermeable Reflecting Interfaces

Dienstag, 28. November 2023 • 14:15 Uhr

Seminarraum SE41 • Forschungsbau (Emil-Fischer-Straße 41, 97074 Würzburg)

Der Vortrag wird auch Zoom-Meeting übertragen: go.uniwue.de/ifmcolloquium-zoom

Abstract. The mathematical problem of homogenization typically involves studying the effective parameters of a system that exhibits rapid variations in its spatial characteristics. However, we focus on a stochastic multivariate homogenization problem of a different kind: the diffusion in the presence of narrowly located semipermeable interfaces.

In simple words, our model reminds of a foiled composite material consisting of a media interlaced with very thin plates of different permeability. In material science such models are referred to as reinforced materials like a glass wool reinforced by aluminium foil. Usually, one is interested in the effective parameters of such a system. By combining the study of stochastic differential equations with local times and homogenization, we explore how the presence of interfaces can alter the diffusion behavior of the limit process.

As a byproduct of our research, we obtain theorems for the existence and uniqueness of solutions to SDEs for multidimensional diffusion processes with membranes. Uniqueness is a problem of particular interest because it implies the strong Markov property of the solution, which is essential for the proof of convergence.

Alle sind herzlich eingeladen.

Die Dozentinnen und Dozenten der Mathematik