Im

## **Oberseminar Analysis**

hält

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im Rahmen eines **Kolloquiums** zu seiner **Masterarbeit** einen Vortrag zum Thema

## Generation of random dynamical systems from stochastic differential equations

Abstract:

Stochastic differential equations (SDEs) provide a natural framework for modeling systems influenced by noise, which can be found in many applications, ranging from physics and biology to financial market models. After a brief introduction of the foundational concepts required to understand such systems, like Brownian motion, Itô integrals, and the formulation of SDEs, we will present the concept of the stochastic flow. It describes how the solution to an SDE evolves in time and being affected by randomness.

We then introduce the notion of random dynamical systems (RDSs), which provide an abstract mathematical framework for analyzing time evolution in the presence of randomness. We reason that the solution of the SDE generates a two-parameter flow of homoemorphisms that can be seen as a stochastic flow. Further we will show how the cocycle property, a key ingredient in the definition of an RDS, arises from this two-parameter flow. This establishes a bridge between probabilistic and dynamical systems theory. At the end, we will present a glimpse on the perfection of such systems and some implications.

 Datum:
 Donnerstag, 17. Juli 2025

 Zeit:
 16:40 Uhr

 Raum:
 WIL A 124

Kontakt: Prof. Dr. Stefan Siegmund

Alle Interessent:innen sind herzlich eingeladen.