

BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

Monday, 7 November 2022, 12:15-13:00

Seminarraum 05.002, Spiegelgasse 5

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Simulation of the Stochastic Heat Equation on the Sphere

ABSTRACT

We consider the stochastic heat equation on the sphere driven by isotropic Wiener noise. Using the spherical harmonic functions, we calculate the solution up to some truncation level leading to a spectral approximation in space.

For the time discretization the exact solution in time is compared to the standard Euler scheme and to a time-adapted forward Euler approximation. We simulate strong errors to show convergence rates of the different methods with and without Monte Carlo approximations. Special emphasis is given to the second moment as an important quantity to describe the properties of the solution.

To illustrate the generated solutions, time evolving sample paths will be integrated as videos. As an application we use these samples to generate evolving stochastic surfaces.

This is joint work with Annika Lang (Chalmers & University of Gothenburg).