Maximal regularity for stochastic PDEs on cones: A functional caclulus approach

Petru A. Cioica-Licht

University of Kassel

cioica-licht@mathematik.uni-kassel.de

Although there exists an almost fully-fledged L_p-theory for (semi-)linear second order stochastic partial differential equations (SPDEs, for short) on *smooth* domains, very little is known about the regularity of these equations on *non-smooth* domains that have corners and/or edges. As it is already known from the deterministic theory, singularities of the boundary may have a negative effect on the regularity of the solution. For stochastic equations, this effect comes on top of the already known incompatibility of noise and boundary condition.

In this talk I will first give an overview of the existing L^p-theory for SPDEs on smooth domains, emphasizing the role of weighted spaces for capturing the behaviour of the solution at the boundary. Moreover, I will summarize a series of papers, where a first weighted L_p-Sobolev theory for second-order SPDEs on angles, polygons and smooth cones has been established by means of Green function estimates and PDE techniques. Finally, I will present some new results on the boundedness of the holomorphic functional calculus of the Dirichlet Laplacian on conical domains in Sobolev spaces with mixed weights, which leads to improved regularity results for the stochastic heat equation and other related SPDEs.

This is joint work with Emiel Lorist (TU Delft) and P. Tobias Werner (Universität Kassel)