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FAKULTÄT
FÜR MATHEMATIK, INFORMATIK
UND NATURWISSENSCHAFTEN

Fachbereich Mathematik

Kolloquium über Mathematische Statistik und Stochastische Prozesse

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Optimal extension to Sobolev rough paths

Abstract:

Rough path theory provides a modern and very successful approach to stochastic (partial) differential equations and related problems in stochastic analysis. This powerful theory requires as fundamental assumption the existence of “rough paths” which are n -dimensional real-valued paths together with its iterated integrals. Of course, for irregular paths, like the sample paths of a Brownian motion, these iterated integrals do not exist as classical Riemann–Stieltjes integrals. This immediately leads to the question of how one can enhance an n -dimensional path to a rough path.

In this talk, we show that every n -dimensional path with suitable Sobolev regularity can be enhanced in a unique, optimal and deterministic way to a Sobolev rough path. In addition, we recover the central result of rough path theory in this Sobolev setting: the solution map associated to differential equations driven by rough paths is locally Lipschitz continuous.

The talk is based on joint works with Chong Liu and Josef Teichmann.

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