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FAKULTÄT FÜR MATHEMATIK
Dekan Univ.-Prof. Dr. Radu Ioan Boţ

Einladung zur öffentlichen Defensio

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Thema der Dissertation

A probabilistic view of Wasserstein gradient flows and the Benamou–Brenier problem

Abstract:
Various diffusion processes can be interpreted as gradient flows of certain energy functionals with respect to quadratic Wasserstein metrics. Such processes are well studied and have applications in many different fields of mathematics. The first goal of this work is to shed new light on Wasserstein gradient flows and related classical topics such as entropy dissipation, variational characterizations, and functional inequalities. For several models of diffusions, we set up a probabilistic framework in order to provide trajectorial interpretations of these topics. Our approach is based on stochastic analysis and time-reversal techniques. The gradient flow property is established via a perturbation analysis, where either the drift or volatility coefficient of the underlying diffusion is used as a control variable.
In classical optimal transport, the contributions of Benamou–Brenier and McCann regarding the time-dependent version of the problem are cornerstones of the field and form the basis for a variety of applications in other mathematical areas. Stretched Brownian motion provides an analogue for the martingale version of this problem. The second goal of this work is to provide a characterization of optimizers in terms of gradients of convex functions, similar to the characterization of optimizers in the classical transport problem for quadratic distance cost. This is achieved by means of a convex duality approach, complemented with a purely variational perspective.

Prüfungssenat

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Zeit und Ort

Montag, 24. Juni 2024, 09:00 Uhr

Online:

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