ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

# Stochastic Mass Transport from Schrödinger to Bass

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HS 11

## ABSTRACT

How can we connect two prescribed probability distributions by a stochastic process whose dynamics deviate as little as possible from Brownian motion? We can influence the motion in two ways: by adding a drift, which introduces a local directional bias, or by changing the diffusion coefficient, which determines the magnitude of the random fluctuations.

The classical Schrödinger problem controls the drift while keeping the diffusion fixed. The Bass problem instead adjusts the fluctuations alone: the drift remains zero, so that the process is a martingale. The recently introduced Schrödinger–Bass problem combines these approaches, allowing both drift and diffusion to be controlled.

We use these problems to illustrate how optimization over stochastic processes can be recast as a static problem over probability distributions. In this formulation, the optimal dynamics are characterized by a system of relations between distributions and transformations connecting them. We explain how this description yields proofs of existence and uniqueness and leads to algorithms for

numerically constructing the optimal process.

**We hope to see you there!**



