

Seminar of Probability and Stochastic Process

Thursday, 1st of October, from 14h15

[MA B2 485](#), EPFL, Ecublens

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EPFL

Stochastic Moving Boundary Problems and Limit Order Book Models

Abstract:

Abstract: Moving boundary problems allow for modeling of multi-phase systems with separating boundaries evolving in time. We want to model a stock market with a large amount of transactions in rather short time where buy- and sell-side of the limit order book are described by semilinear second order SPDEs. In this system, the mid price process defines a moving boundary, separating buy- and sell-side. Following empirical observations by Cont et al. (2013) and Lipton et al. (2013), we assume price changes to be determined by the bid-ask imbalance. The resulting limit order book model can be considered as a generalization of the linear stochastic Stefan problem introduced by Kim, Sowers and Zheng (2012).

In order to show existence of a solution we transform the problem into a stochastic evolution equation, where the boundary interaction leads to additional terms in the equation. Combining results from classical theory of stochastic equations in infinite dimensions, interpolation theory and stochastic maximal L^p -regularity,

we establish a framework for existence, continuity and further analysis of this class of equations.

This is joint work with Martin Keller-Ressel.

Note. M. Mueller is a Ph.D. student of Prof. Martin Keller-Ressel and is currently visiting ETHZ

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