

1. Quantitative risk management: This project deals with the discussion of a framework and tools of a variety of risk management problems. Every financial institution has a risk management department which analyzes aggregated portfolio-wide risks on longer time scales and risk exposure to large or extreme market movements. In this project we also aim at the implementation of tools from quantitative risk management to study e.g. some of the above mentioned problems.

2. Modeling of rough stochastic volatility: Motivated by empirical evidence in connection with financial market data, we want to discuss in this project new (stochastic) models for the description of the dynamics of stochastic volatility over time based on rough path theory. Rough path theory, which is a recently developed mathematical theory, will provide us in this project with a deterministic tool for the definition of stochastic integrals used in our models.

In this project, we are also interested to implement stochastic volatility models based on market data.

3. Theory of risk measures in mathematical finance: This project is devoted to the mathematical construction of various types of risk measures and the representation of risk measures. A risk measure (as e.g. the value at risk measure, VaR) is typically used to measure the risk involved in connection with a financial portfolio.

In this project we also aim at the implementation of risk measures with respect to certain financial problems.