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Bayesian Inference of regime-switching models

Prof Ludger Overbeck (Justus-Liebig University Giessen, Germany)

DATE: Monday, 3 March 2025 | 16h00–17h00 SAST

VENUES:

- Neelsie Cinema, Stellenbosch University
- Online

--- A recording of the talk will be published on the NITheCS YouTube channel afterwards ---

ABSTRACT

Markov Modulated Stochastic Processes (MMSP) are a flexible class of stochastic processes which capture regime switches in their parameters. In finance and economics, this might be a new interest rate shift or a sudden increase in volatility. The changes in hidden states are linked to a Markov Chain. These models have been used to model option prices, renewable energy markets as well as risk quantification. Our estimation approach involves applying Bayesian techniques to recover the hidden states and the parameters associated with each state of the Markov Chain. We propose Markov Chain Monte Carlo (MCMC) algorithms to perform Bayesian inference for MMSPs, a technique also used in some areas of Artificial Intelligence. This work is conducted in collaboration with Tridash Srivastava (Warwick, UK) and Anindya Goswami (IISER Pune, India).

BIOGRAPHY

Prof Ludger Overbeck is a professor at the Institute of Mathematics at Justus-Liebig University Giessen in Germany. He holds a PhD in Probability Theory and Habilitations in Applied Mathematics from the University of Bonn, as well as in Economics from the University of Frankfurt.

His academic interests lie in Stochastic Analysis, Mathematical Finance, and Quantitative Methods in Risk Management. He has extensive experience consulting for financial institutions in risk management, regulatory frameworks, portfolio management, financial engineering, and structured product pricing. His clients include regulatory authorities such as the Bank for International Settlements (Basel), World Bank (Washington), Central Banks of Thailand, Colombia, Pakistan, Bahrain, Italy, KPEI Indonesia, Monetary Authority of Singapore, as well as German and European financial authorities. He also consults for many commercial banks worldwide.

Before assuming his professorship in 2003, Prof Overbeck spent nearly seven years at Deutsche Bank in Risk Analytics and at Deutsche Bundesbank in the banking supervision department. He has published extensively in academic and applied journals. Additionally, he co-authored a book on credit risk modelling with Christian Bluhm and Christoph Wagner and a book on structured credit products with Christian Bluhm.



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