Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Statistics and Actuarial Science
Statistiek en Aktuariële Wetenskap

NITheCS
National Institute for Theoretical and Computational Sciences

S E M I N A R

Ronald Mahomane
(Autochek Financial Services)

Bayesian regime-switching models for lifetime ECL under IFRS 9: A probabilistic framework for macroeconomic uncertainty

Date:
Friday, 26 September 2025

Time:
13h10-14h10 SAST

***Venues*:**
- Room 2048, 2nd floor
  Van der Sterr Building,
  cnr Victoria & Bosman Streets
  Stellenbosch
- Online

WHO SHOULD ATTEND?
All are welcome.

ENQUIRIES:
Elizna Huysamen
☎ +27 (0)21 808 3244
✉ krugere@sun.ac.za

ABSTRACT:
We introduce a deep reinforcement learning (DRL) framework to solve the intertwined problems of optimal trade execution and real-time risk management in high-frequency futures markets. Traditional execution algorithms are often based on simplified assumptions that do not capture the complex, non-linear dynamics of the limit order book. Our DRL agent learns an optimal policy directly from high-frequency data, balancing the trade-off between minimizing market impact costs and controlling inventory risk. The agent's state representation includes both public information from the order book and private information about its own inventory. Its reward function is explicitly designed to penalize inventory risk, measured by the variance of the portfolio's value. Using a high-fidelity backtesting environment on generated data and samples of E-mini S&P 500 futures data, we show that our DRL agent significantly outperforms standard benchmarks, including TWAP, VWAP, and a calibrated Almgren-Chriss model. The performance improvement is particularly pronounced in volatile market conditions, demonstrating the agent's ability to learn adaptive, state-dependent strategies. Our findings suggest that DRL offers a powerful new tool for navigating the complexities of modern financial markets.

REGISTER: https://bit.ly/4mtxGEc

science, technology & innovation
Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

NRF National Research Foundation