

DEPARTMENT OF DECISION SCIENCES

RESEARCH GROUPS

Title of the research group	Quantitative Finance
Research group leader	Professor HP Mashele
Members of the research group (full names)	- Prof. Mashele Hopolang, - Prof Mmboniseni Mulaudzi, - Prof. Safari Mukeru, - Dr Marc Mukendi Mpanda, - Prof Edson Pindza, - Dr Njengele Kenneth Kennedy Dukuza, - Dr Lebogang Sesale, - Dr Shivani Singh, - Dr Tlou Luzarus Kubjana
Research objectives	The research group in Quantitative Finance focus on studying and applying techniques from Stochastic Processes, Approximation Theory, Machine Learning, and Control Theory to better understand and address problems in the fields of Financial Derivatives Pricing, Portfolio Optimisation and Risk Management.
Keywords	- Stochastic Calculus - Volatility Modelling - Control Theory - Financial Derivatives Modelling - Portfolio Optimisation - Financial risk modelling - Financial Machine Learning - Market Microstructure - Algorithmic Trading
Catalytic Niche Areas	Fourth Industrial revolution and Digitalisation
Selected research outputs (10 max/ if available)	Umeorah, N., Mashele, P., Agbaeze, O. and Mba, J.C., 2023. Barrier options and Greeks: Modeling with neural networks. <i>Axioms</i>, 12(4), p.384.

Mpanda, M.M., Mukeru, S. and Mulaudzi, M., 2022. Generalisation of fractional Cox–Ingersoll–Ross process. *Results in Applied Mathematics*, 15, p.100322.

Mukeru, S., Mulaudzi, M.P., Nzabanita, J. and Mpanda, M.M., 2020. Zeros of Gaussian power series with dependent random variables.

Umeorah, N., Mashele, P. and Ehrhardt, M., 2019. Elliptical and Archimedean copula models: an application to the price estimation of portfolio credit derivatives. *Journal of Credit Risk*, 17(1).

Sonono, M.E. and Mashele, H.P., 2016. Estimation of bid-ask prices for options on LIBOR based instruments. *Finance Research Letters*, 19, pp.33-41.

Mukuddem-Petersen, J., Petersen, M.A. and Mulaudzi, M.P., 2014. Optimizing Basel III Liquidity Coverage Ratios. *Brygida Cullen (Hg.): Dynamic Programming and Bayesian Inference, Concepts and Applications: In Tech*, S, pp.67-90.

Petersen, M.A., De Waal, B., Mukuddem-Petersen, J. and Mulaudzi, M.P., 2014. Subprime mortgage funding and liquidity risk. *Quantitative Finance*, 14(3), pp.545-555.