



**The Hong Kong University of Science and Technology**

**Department of Mathematics**

**MPhil THESIS EXAMINATION**

***Ensemble Option Forecasting***

*By*

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**ABSTRACT**

This thesis proposes a new model to forecast option prices with an ensemble of cutting-edge deep learning algorithms. We predict the entire volatility surface of 300 Technology stocks and use Rough Volatility (Gatheral, 2017) as benchmark. We demonstrate that our ensemble of deep learning techniques has also better stock log returns predictability power with over 400 factors reduced to 14 latent via auto-regressive auto-encoder. We predict option prices via an ensemble of linear regression, Rocket, Auto-ML and Temporal Fusion Transformer. We ensemble models with an expanding optimization algorithm on the testing dataset. We rank forecasts of option price returns in the universe and select options that satisfies an initial amount of capital. We show our strategy has satisfying performance metrics.

**Date: 15 July 2021, Thursday**

**Time: 2:00 p.m.**

**Venue: Online via Zoom**

**<https://hkust.zoom.us/j/5399298177> (Passcode: OptionML)**

**Thesis Examination Committee**

**Chairman : Dr Can YANG, MATH /HKUST**

**Thesis Supervisor : Prof Kani CHEN, MATH/HKUST**

**Member : Dr George Kamenov PANAYOTOV, FINA/HKUST**

*(Open to all faculty and students)*

The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).