

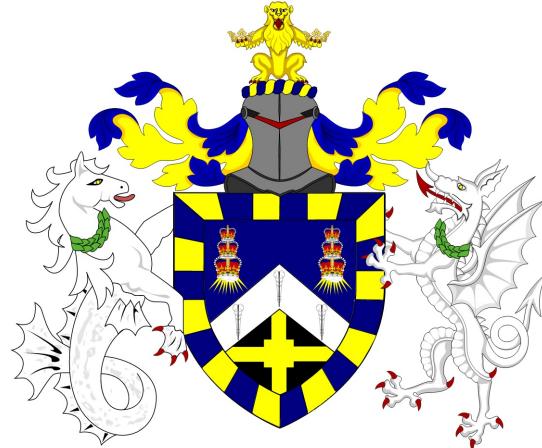
Financial Mathematics MSc Dissertation MTHM038, 2025/27

# **Title of the Thesis**

With special emphasis on examples

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A thesis presented for the degree of  
Master of Science in Financial Mathematics

School of Mathematical Sciences  
and School of Economics and Finance  
Queen Mary University of London

# Declaration of original work

This declaration is made on February 9, 2026.

**Student's Declaration:** I Matthew Walmsley hereby declare that the work in this thesis is my original work. I have not copied from any other students' work, work of mine submitted elsewhere, or from any other sources except where due reference or acknowledgement is made explicitly in the text. Furthermore, no part of this dissertation has been written for me by another person, by generative artificial intelligence (AI), or by AI-assisted technologies.

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3. explicitly mentioning the source in the text.

This work is dedicated to ABC XYZ

# Acknowledgements

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# Abstract

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# Chapter 1

## Introduction

This note presents a conjecture stemming from our investigations in the generation of sigmoid tensor categories of Picard numbers of tori in Banach algebras. Example text

### 1.1 Motivation for this work

In the works of Petri ([2, Theorem 2.3]) we find the following statement

**Theorem 1.1.1** ([2, Theorem 2.3], see also [1, pg. 45]). *The Gramm matrix for  $E_8$  is:*

$$\begin{pmatrix} 2 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ -1 & 2 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 2 & -1 & 0 & 0 & 0 & -1 \\ 0 & 0 & -1 & 2 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 2 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 2 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 2 & 0 \\ 0 & 0 & -1 & 0 & 0 & 0 & 0 & 2 \end{pmatrix}.$$

### **1.1.1 The problem of exponential extensions**

Example text

### **1.1.2 The approach of Junderstein**

Example text

# Chapter 2

## Eulerian topological string motives

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### 2.1 Definitions

Example text

#### 2.1.1 Tate's theorem

Preliminary considerations Example text

Motivic financial algebroids Example text

#### 2.1.2 Grothendieck topologies

Example text

## 2.2 Calculation of the invariant cycles

Example text

### 2.2.1 Fontaine's theorem

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# Chapter 3

## Conclusions

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# **Appendix A**

## **Implementation of the BarrierOptionCVA class**

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## **Appendix B**

### **Additional details on the Gundermanian determinant**

Example text

# Bibliography

- [1] Fischer Black and Myron Scholes. The pricing of options and corporate liabilities. *Journal of Political Economy*, 81(3):637–654, 1973.
- [2] William Petri. Analysis of infinitely generated frog complexes. *Rendiconti Ranæ Analysorum*, 234(4):34–21, 2015.