BOUDCHICHI Oussama

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: https://github.com/OussamaBOUDCHICHI

Education

Université Paris Cité | ***Master of Science*** 2022 – 2023

Random Modelling, Finance & Data Science (M2MO, ex-DEA Laure ELIE) Paris, France

- Stochastic calculus & Diffusions models, Volatility & Interest rates models, Monte Carlo & PDE methods, Non linear methods in Finance, Advanced numerical & Probabilistic methods in Finance, Machine/Statistical/Reinforcement learning applied to Finance, Stochastic optimal control, Lévy processes, Optimal High Frequency trading, Energy markets.

National Institute of Statistics & Applied Economics | ***Engineering Degree*** 2019 – 2022

Quantitative Finance & Actuarial Science Rabat, Morocco

- **Quantitative Finance** (Arbitrage theory and derivatives pricing, Quantitative asset management, Fixed-income Markets), **Numerical Methods** (Monte Carlo Methods, PDEs) and **Mathematical Statistics** (Inferential & Multivariate statistics, Time series, Copulas)

Preparatory Classes | ***MPSI-MP*** 2017 – 2019

Mathematics & Physics Oujda, Morocco

- Intensive two years courses in Mathematics, Physics and Computer Science to integrate the most prestigious engineering schools in France & Morocco.

Professional Experience

Quantitative researcher FO intern April 2023 – September 2023

Crédit Agricole Corporate & Investment Bank Paris, France

- **Path-Dependent Local Volatility Models : Theoretical study & back-tests.** Tasks done so far : Devised and proved an approximation formula for the price of vanilla options and the ATM implied volatility using singular perturbation theory. Implemented & integrated the model into the team's pricing library (ELib) and pricing application (Sophis). Other topics under investigation : Devise a calibration procedure of the leverage function using a spectral decomposition of the underlying Dynkin-Feller generator ... Tools : **C++, C#, Python, EquityLib, SophisRisque.**

Quantitative research intern March 2022 – June 2022

Société Générale Corporate & Investment Banking Casablanca, Morocco

- **Stochastic optimal control & Stochastic Approximation applied to optimal execution problems.** Proof of the existence of solutions to the Hamilton-Jacobi-Bellman PDEs & to the control problems. Deriving analytical formulas of optimal controls and value functions in some special frameworks. Proof of the existence and uniqueness of the maximum of a payoff function that is represented as an expectation. Proof of the the convergence of a Robbins-Monro like stochastic algorithm. Numerical simulations and calibrations using : C++/ Python/ Julia.

Quantitative research intern July 2021 – September 2021

Société Générale Corporate & Investment Banking Casablanca, Morocco

- **Local Volatility modelling & Stochastic Volatility Inspired parametrization.** Presentation of Local volatility models (Existence and uniqueness (Gyöngy's theorem), Dupire's Equation, problems in calibration (ill-posed inverse problem)). Presentation of the SVI parametrization (Roger's Lee moments formula, Model formulation, properties, problems in taking the absence of Calendar Spread into account during calibration). Link: https://bit.ly/LocalVolSVI

Personal & Academic Projects

Numerical Methods for PDEs

Worked on many numerical methods to approximate solution of Non-Linear PDEs and obstacle problems (e.g. Hamilton-Jacobi-Bellman PDEs ...)

Recursive computation of VaR/CVaR using (Quasi)-Stochastic approximation with Importance Sampling | *Python* December 2022

On the Epps effect and its relationship to asynchronous trading | ***Python*** January 2022

Presentation of the relationship between the Epps effect and asynchronous trading. Implementing the main estimators of correlation in the presence of micro-structure noise (Malliavin-Mancino & Hayashi-Yoshida) using Numba. Link: https://bit.ly/EppsEffect

Skills

Programming Languages: **C++ (OOP, Generic programming ...)**, **Python**, **C#**, Julia

Languages: English : Fluent, French : DELF, Arabic : Native