Romain Dufetelle

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Website | LinkedIn | GitHub

Quantitative Research / Quantitative Analysis
Available immediately

Education

MSc — Year 2 — **École Polytechnique / Sorbonne University** — Sept 2025 – Sept 2026
Probability and Finance (DEA El Karoui)
Overall average: 13.45/20 (French grading scale)
- Selected coursework: diffusion processes, Monte Carlo methods, stochastic control, derivatives modelling, interest rate models, machine learning.

MSc — Year 1 — **Sorbonne University** — Sept 2024 – Jul 2025
Mathematics and Applications
Overall average: 17.47/20 (French grading scale)
- Selected coursework: advanced probability, statistics, numerical PDEs, numerical optimisation.
- Conducted a research project on anisotropic percolation and presented findings to researchers at LPSM.

BSc — **University of Rouen** — Sept 2021 – Jul 2024
Mathematics
Overall average: 16/20 (French grading scale)
- Selected coursework: measure theory, probability, numerical analysis.

Experience

Quantitative Model Validation Intern — BPCE — Apr 2026 – Oct 2026
- Implemented a local stochastic volatility (LSV) model with stochastic interest rates in C++ and integrated it into BPCE's model validation library.
- Validated the implementation against reference models using limiting-case tests, convergence checks, and independent vanilla option repricing.
- Assessed pricing impacts on vanilla options, autocalls, and hybrid vanilla options with constant maturity swap (CMS) barriers across volatility, interest rate, and correlation scenarios.

Research & Projects

Weak existence and exact calibration of local stochastic volatility models — 2026
Romain Dufetelle — *Preprint*
- Established weak existence and exact calibration results for local stochastic volatility models, including Heston–LSV under explicit assumptions.
- Derived quantitative bounds on vanilla option pricing errors induced by calibration defects and denominator regularisation.

Particle Calibration of Local Stochastic Volatility with Stochastic Rates — 2026
Research project conducted during the BPCE internship
- Derived the leverage-function calibration identity and implemented C++ particle calibration using kernel estimates of conditional expectations.
- Reduced weighted estimator variance by 90–95.5% at 20,000 particles using an LSV-PDE reference; assessed repricing gains and computational cost across four estimators and two synthetic markets.

Robust Cryptocurrency Price Aggregation under Market Fragmentation — 2026
- Designed robust reference-price aggregation for fragmented crypto markets using order-book and exchange-level data.
- Used kurtosis-based scores to flag unreliable exchanges; compared robustness with that of classical estimators under heavy-tailed noise and copula dependence.

Technical Skills

Programming: C++, Python, R, MATLAB
Numerical Methods: Monte Carlo, particle methods, kernel regression, variance reduction, PDE-based calibration
Financial Modelling: Equity derivatives, local stochastic volatility, stochastic rates, market microstructure