LUCHEN (TOM) SHI

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EDUCATION

Expected 12/24 **NEW YORK UNIVERSITY**   New York, NY
The Courant Institute of Mathematical Sciences
M.S. in Mathematics in Finance
- *Expected Coursework:* stochastic calculus, risk and portfolio management, dynamic asset pricing, time series analysis, machine learning, computational statistics, market microstructures

09/19 - 05/23 **CORNELL UNIVERSITY**   Ithaca, NY
B.A. in Mathematics, Concentration in Statistics
- *Coursework:* mathematical statistics, probability theory, stochastic calculus, stochastic processes, real analysis, machine learning, OOP and data structures, statistical learning theory
- *Honors/Awards:* 2023 Alibaba Global Mathematics Competition Finalist (Top 1%); 2022 Cornell Summer Mathematics Research Grants Recipient; 2022 Cornell Deloitte Innovation Competition, 1st place

EXPERIENCE

01/24 - 07/24 **KAFANG TECHNOLOGY**   Shanghai, China
(AI-driven, algorithmic trading firm)
Quantitative Research Intern (Python)
- Analyzed stock order data to build factors with information coefficients (IC) that increased by ~17%, with Sharpe ratio of strategy increased by ~11%, covering frequencies from 10s to 90s
- Studied market microstructures of convertible bonds to construct signals with IC increasing by ~25% with Sharpe ratio of strategy increasing by ~13%, covering frequencies from 90s to 1,800s
- Developed and implemented singular value decomposition (SVD) entropy method on stock logarithmic return correlation matrices, deriving stock factors that improved average IC by ~12%
- Applied multivariate Hawkes process to model self-excitement effects of marketable large order arrivals, achieving 95%+ accuracy in distribution comparisons using Kolmogorov–Smirnov tests
- Adapted micro-price return model to predict mid-price returns over 3s windows for 50+ China A shares, enhancing predictive accuracy by 19% with cubic-fitted curves

PROJECTS

04/23 - 08/23 **CORNELL UNIVERSITY**   Ithaca, NY
Geodesics Optimal Transport Between Gaussians for Wasserstein GAN
- Developed Geodesic Optimal Transport-Wasserstein GAN between Gaussians, ensuring theoretical convergences of generator parameters under gradient descent algorithm
- Derived upper bounds of WGAN objective functions in different scenarios, employing methods such as maximum likelihood estimation (MLE) and maximum a posteriori (MAP)

01/22 - 12/22 **Congruence of Linear Symplectic Forms by Symplectic Groups** (Mathematica)
- Provided complete classifications of linear symplectic form orbit space in 4 dimensions and established necessary conditions for intertwining these forms
- Investigated action of linear symplectomorphisms on symplectic forms, and determined invariants identified as polynomial expansion coefficients of Pfaffian terms

12/21 - 09/22 **Enumeration of Random Walk Positions in d-Dimensional Lattice**
- Derived general formula to count possible final positions for n-step random walk in d-dimensional integer lattice, with constraint that final destinations had largest norm
- Used generating functions method and Faulhaber's formula to derive formula that counted possible positions given constraint; presented theorem through matrix representation

COMPUTATIONAL SKILLS / OTHER

Programming Languages: Python (advanced), C++ (elementary)
Languages: English (fluent), Mandarin (native)