

SHI JIAYU

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EDUCATION

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- National University of Singapore (NUS)** Overall CAP: 5.0/5.0 2020.08-Present
Ph.D. student, Department of Mathematics Supervisor: Zhou Chao, Toh Kim-Chuan
- Full CAP Courses: Graduate Analysis I, Graduate Complex Analysis, Advanced Mathematical Programming, Computational Mathematics, Probability Theory II, Advanced Financial Mathematics, Optimal Stopping and Stochastic Control in Finance
 - TA Courses: FE5211 Seminar in Financial Engineering, 2020/2021 Special Term (Part 2); MA5248 Stochastic Analysis in Mathematical Finance, 2020/2021 Semester 2; MA4269 Mathematical Finance II, 2020/2021 Semester 1
 - Awards and Honors: First Place in Citadel APAC Regional Datathon, Spring 2021; NUS Research Scholarship, 2020-Present
- Tsinghua University (THU)** Overall GPA: 3.67/4.0 2016.07-2020.06
B.S., Department of Mathematical Sciences Supervisor: Dong Bin, Lu Xuguang
- Full GPA Courses: Measures and Integrals, Complex Analysis, Differential Geometry, Mathematical Analysis II, Methods of Optimization, Applied Stochastic Processes, Statistical Inference, Linear Regression, Multivariate Statistical Analysis, Quantum Mechanics, Physics for Scientists and Engineering B II, Data Mining: Methodology and Application
 - TA Courses: Introduction of Scientific Computing with Matlab, 2017-Summer
 - Awards and Honors: Excellent Academic Performance in THU, 2019; Excellent Academic and Research (Zheng Zongcheng) Scholarship, 2018; Excellent Scientific Research Project in THU, 2018; National Second Prize in China Undergraduate Mathematical Contest in Modeling, 2018

RESEARCH

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- Solving Eikonal equations in Low- and High-dimensions** 2019.07-Present
Supervisor: Prof. Dong Bin, Beijing International Center for Mathematical Research, Peking University.
- Self-learned Numerical PDEs, used **Matlab** to reconstruct functions from Fast Marching (FM) and Fast Sweeping (FS).
 - Reviewed characteristic methods, Feymann-Kac formula and Forward-Backward Stochastic Differential Equation (FBSDE) on characterizing solutions to different types of PDEs.
 - Reviewed the relations between Control Problems, Dynamic Programming and Hamilton-Jacobi PDE, as well as the relations between RL, Stochastic Control Problems, Hamilton-Jacobi-Bellman PDE and FBSDE.
 - Used **TensorFlow 1.14.0 in Python** to reconstruct functions from Physics informed DL.
 - Self-designed Characteristics Informed DL to solve Eikonal equations and other 1-st order nonlinear PDEs. Exploring on combining characteristic methods with other statistical methods to design fast Eikonal solvers.
- Bernoulli Site v.s. Bond Percolation** 2018.02-2019.04
Supervisor: Prof. Wu Hao, Yau Mathematical Sciences Center, THU.
- Read “Percolation” of Bela Bollobas and “Percolation” of Geoffrey Grimmett. Extended main properties of bond percolation to site percolation. Learnt basic graph theory and computed critical values on several special lattices.
 - Wrote a review paper on existences and relationships of bond and site percolation critical values on different graphs.

PROJECT AND INTERNSHIP

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- Historical Stability Data Mining** 2019.02-2019.06
Supervisor: Dr. Qin Peng, Dept. of IT, P&G and Prof. Xu Hua, Dept. of Computer Science and Technology, THU.
- Used **R** to conduct collinearity detection and distribution transformation on abnormal data, used Logistic and LASSO regression to predict product quality. Introduced Information Entropy to evaluate model confidence.
- Sector-neutral Score Strategy & Symmetric-orthogonal Index-strengthened Strategy** 2019.01-2019.02
Supervisor: Dr. Zhang Jimin, Dept. of FOF Investment and Financial Engineering, Aegon Industrial Fund Management.
- Used **R** to construct strategies combining neutralization, orthogonalization and ICIR to determine factor weights, regression and optimization to compute stock weights rolling with time.
 - Back-tested on daily data of 3000+ stocks over 10 years, won 5% net worth over index.

MISCELLANY

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- **Programming:** Proficient in Python, Matlab, R; Intermediate in C++, Julia
 - **Languages:** Mandarin (native), English (TOEFL 106, Speaking 26, Writing 28)
 - Interests: Violin; Swimming and Tennis
 - Class President of Class 61 in the Department of Mathematical Sciences, THU
 - Writer and Director of Drama “Riemann’s Journey” at Students’ Festival (awarded Excellent Art Achievement in THU)
 - Attended Northeast Asia Summit of Young Leaders in Korea on behalf of AIESEC THU (awarded Excellent Volunteer Achievement in THU)