Yiran Hu

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EDUCATION

- Ph.D. in Mathematics — The University of Texas at Austin • Expected May 2024
  - Research focus: Partial differential equations of the 3D singular quasi-geostrophic system
  - GPA: [4.0/4.0]
- B.Sc. in Pure and Applied Mathematics — Nanjing University • Sep 2014 – Jul 2018
  - Distinction: Summa cum laude
  - GPA: [4.3/5.0]

PUBLICATION AND PREPRINT

- Hu Yiran. "Global in Time Weak Solutions to Singular 3D Quasi-Geostrophic Systems." arXiv preprint arXiv:2302.05973 (2023)".
- Yiran Hu, Alexis Vasseur. Propagation of Regularity for a Singular Family of 3D Quasi-Geostrophic System, In preparation.
- Yiran Hu, Alexis Vasseur. An Extension Problem related to the 2D Euler Equation, In preparation.

EXPERIENCES

- Quantitative Research Intern@Credit Team — World Quant LLC • Jun 2023 – Aug 2023
  - Applied generalized reduced gradient methods to accelerate the optimization problems with a large volume of data.
  - Developed stock trading strategies by applying Deep Learning (Auto encoder) to time series data.
  - Presented an overview of academic literature to connect the **credit** market and the **equity** market.
- Well-posedness of Singular 3D QG System — The University of Texas at Austin • 2018 - Present
  - Generalized the 3D singular quasi-geostrophic (3D QG) system from the 2D case by proposing interpretable physics problems that improve the description of temperature dynamics near the surface of the Earth.
  - Analyzed and proved mathematically the existence and regularity of the solutions by using the elliptic analysis, extension method, Aubin Lions Lemma, and weighted spaces.
- Numerical analysis for SQGf System — The University of Texas at Austin • 2020 - Present
  - Utilized numerical analysis and simulation methods to obtain the conjunctures for analysis on singularities of surface quasi-geostrophic front (SQGf) equations by implementing specialized RK-4 and spectrum method in Python and MATLAB with scientific packages including numpy, py-pde, matplotlib, simulink, etc.
- Teaching Assistant and Research Assistant — The University of Texas at Austin • 2018 - Present
  - Organized group seminars among graduate students, professors, and outreaches.
  - Designed and taught both undergraduate and graduate courses including calculus, linear algebra, differential equations, applied mathematics, complex analysis, and numerical analysis.
  - Mentored undergraduate students and helped them present on topics including SVM, stochastic calculus for finance and Fourier and wavelet transforms, quantum mechanics, and numerical PDEs.

SKILLS

- Programming languages: Python, R, Excel, MySQL, MATLAB, C++, LaTeX, Markdown
- Languages: English (fluent), Chinese (native)