

YUTONG KUANG

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EDUCATION

Beijing Normal University

Beijing, China

Bachelor of Mathematics and Applied Mathematics

Sep 2018 – Jun 2022

- GPA : 3.80/4.00; admitted based on performance in the national college admissions exam (678/109899)
- Selected awards: Meritorious Award in MCM Competition, Candidate for National Scholarship in 2019-2020 Academic Year (5/155) , First-Class Academic Scholarship, Excellent Student in Beijing Normal University
- Selected courses: Advanced Algebra(99), Probability(99), Mathematical Statistics(99), Complex Variables Functions(99), Synthesis Programme(98), Data Structure and Algorithm Analysis(97), Functional Analysis (96)

Beijing Normal University

Beijing, China

Master of Computational Mathematics

Sep 2022 –Present

- Selected awards: First-Class Academic Scholarship, Excellent Student in Beijing Normal University
- Graduate level courses: Numerical Solution of Partial Differential Equation(94), Partial Differential Equation(93), Intelligent Computing(93), Functional Analysis(90), Probability Theory(90)

RESEARCH AND CODING EXPERIENCE

Beijing Normal University (Department of Computational Mathematics)

Beijing, China

Advisor: Professor Yongyong Cai, Title: Young Thousand Talents Program

Sep 2022 – Present

Superfluid Current across a barrier in a Ring Lattice (work in progress)

- Exploring the current at stationary points of an energy functional for a Bose-Einstein Condensate (BEC) on a ring lattice with N sites. This study involves introducing a barrier at site 1 (V_1), where the trapping potential V_1 is non-zero, causing the energy functional to deform and stationary points to shift. The project uses numerical algorithms to analyze how these changes affect the super-current.
- Applying numerical continuation methods (similar to Newton method) to trace the evolution of stationary points with increasing V_1 and the repulsive parameter g . This research includes developing a custom numerical continuation code for flexible analysis.
- Investigating the dynamics of an adiabatic process using the Runge-Kutta and Strang-splitting spectral methods, focusing on a gradual increase of V_1 over time.

Beijing Normal University (Department of Mathematics and Applied Mathematics)

Beijing, China

Advisor: Professor Yongyong Cai, Title: Young Thousand Talents Program

Nov 2021 – May 2022

Numerical Solution of the Complex Gross-Pitaevskii Equation: stationary states and dynamics(Department-level Outstanding Graduation Thesis)

- Analyzing the complex Gross-Pitaevskii equation as a model for BEC in the exciton-polaritons system, focusing on the properties of its solutions.
- Employing the collocation method to solve the stationary radial solution of the complex GPE.
- Using numerical continuation to track changes in stationary solutions concerning parameter variations, identifying the solution with the lowest chemical potential as the ground state. Computations were conducted using the AUTO-07p software package.
- Solving the complex GPE numerically with the Strang-splitting spectral method, observing the formation and constant rotation of vortex lattices in unstable conditions.
- Project code available at: <https://github.com/xixi2219/CGPE>

Beijing Normal University (Department of Mathematics and Applied Mathematics)

Beijing, China

Advisor: Professor Wenming Hong

May 2019 – May 2020

Option Pricing Model Based on Stochastic Analysis

- Authored a report on Option Pricing Models, starting with a single-period binomial no-arbitrage model and expanding to a multi-period version. The study derived the risk-neutral pricing formula for discrete scenarios using martingales.
- Investigated the transition to continuous scenarios by conducting n binomial experiments within one unit of time, with n approaching infinity, to determine the limiting distribution of stock prices.
- Applied stochastic analysis to calculate differentials of portfolio and option values, deriving the Black-Scholes-Merton equation and providing the continuous Black-Scholes formula for option pricing in continuous time.

2020 Mathematical Contest In Modeling(M Prize)

Group Leader

Beijing, China

Mar 2020 – Mar 2020

Product Evaluation System Based on Customer Reviews

- Exploited the rich information in customer reviews to develop a product evaluation system integrating star ratings, text reviews, and helpfulness ratings. This involved uncovering the interrelations among these factors using text mining and natural language processing (NLP) techniques. The system was built with Python and MATLAB, utilizing tools like word frequency analysis to provide a thorough assessment of product sales.

Numerical Solution of Partial Differential Equation(Course Project)

Perfect Score on regular assessments

Beijing, China

Feb 2023 – Jun 2023

- Developed a MATLAB program for the five-point difference scheme and conducted error analysis for solving the Poisson equation. Authored an accompanying experimental report using LaTeX.
- Created MATLAB programs for Explicit, Implicit, and Crank-Nicolson schemes to address modeling problems in parabolic equations, including error analysis. Documented the findings in an experimental report with LaTeX.
- Programmed in MATLAB for Upwind, Lax-Wendroff, and Beam-Warming schemes for hyperbolic equations and their error analysis. The results were reported using LaTeX.
- Composed MATLAB programs for various numerical methods to solve systems of linear equations and the multigrid method. Presented a comparative analysis of these methods.
- Project code is available at: <https://github.com/xixi2219/Numerical-Solution-of-PDE>

SELECTED AWARDS AND HONORS

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|---|------|
| • Candidate for National Scholarship (5/155) | 2020 |
| • Meritorious Award in MCM Competition | 2020 |
| • Third Prize in the National College Student Mathematics Competition | 2020 |
| • Outstanding Graduation Thesis at Department Level | 2022 |
| • First-Class Academic Scholarship | |
| • Excellent Student in Beijing Normal University | |
| • Social Work Award | |

PROFESSIONAL EXPERIENCE

Chongqing Xianshi Investment Management Co., Ltd

Chongqing, China

Quantitative Strategy Department

Jun 2022 – Aug 2022

- Acquired knowledge in the financial industry and quantitative investment during my internship. Engaged in active discussions with team members on trading strategies, learning to construct a quantitative framework, and mastering strategy replication and backtesting. Successfully coded and backtested a trading strategy based on transaction volume, in addition to replicating several other strategies, using Python.

ADDITIONAL INFORMATION

Leadership and Community Activities

- **Class President** Sep 2022 – Present
Organized a class trip to Yu Yuan Tan Park, held multiple class meetings, and effectively communicated important information to classmates.
- **President of the Olympic Mathematics Association at BNU** Nov 2019 – Nov 2020
Co-founded the Academic Seminar Department within the OM Academic Club. Recruited passionate students to study and discuss advanced mathematics topics relevant to the Qiu Chengtong University Mathematics Competition, leading to significant improvements in competition results. Organized events including the MCM Sharing Session, simulated exams, student exchange sessions, competition training, and discussion sessions. Managed the organization's social media account.
- **Class Study Representative** Sep 2018 – Jun 2022
Coordinated multiple study groups, helping peers address and overcome academic challenges.

Interests

- Clarinet, electronic keyboard, badminton, table tennis, jogging, traveling, investment

Computer and Language Skills

- MATLAB, Python, LaTeX, C, Microsoft Word/Excel/PPT
- TOFEL: 94