Dingtao Shen

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Education

University of Wisconsin-Madison *Sep. 2022 - Present*
M.A. in Mathematics

Zhejiang University *Sep. 2017 - Jun. 2021*
B.S. in Information and Computing Science *GPA: 3.62/4.0*

Research & Academic Experience

Research Assistant (Full Time) *Jul. 2021 - Jun. 2022*
School of Mathematical Sciences, Zhejiang University *Hangzhou, China*

- **Mentor**: Prof. Xinghui Zhong
- **Research project**: Local discontinuous Galerkin method with implicit-explicit multistep time discretization for solving the nonlinear Schrödinger equation.
- **Accomplishment**:
  - Completed theoretical proof of the optimal error estimates in Implicit-Explicit local Discontinuous Galerkin method (IMEXLDG) with two-step BDF.
  - Performed numerical experiments to verify the accuracy and efficiency of the IMEXLDG method with two-step BDF.
  - Participated in the organization of the research paper.

Seminar on Frontier Mathematics *Sep. 2020 - Jan. 2021*
School of Mathematical Sciences, Zhejiang University *Hangzhou, China*

- **Mentor**: Prof. Weihong Bi
- **Topic**: Mathematics in machine learning, involving basic theory and comprehensibility of machine learning; computational learning theory; Bayesian decision theory, etc.
- Completed a project and delivered a report on the linear model and clustering.

Visiting International Student Program *Sep. 2020 - May. 2021*
University of Wisconsin-Madison *Online*

- **Track**: Mathematics
- **Courses**: Analysis II; Modern Algebra II; Introduction to PDE; Stochastic Process; Methods of Applied Mathematics II;

Visiting Student *Sep. 2019 - Jun. 2020*
State Key Lab of CAD&CG at Zhejiang University *Hangzhou, China*

- **Research Group**: Reinforcement learning in grid optimization
- Learned about the reinforcement learning theory and application in industry.
- Implemented a sample of Game AI with reinforcement learning model and algorithm.
- Worked on optimization on the control of grid system.

Additional Work Experience

Project Assistant - Grader *2022 Fall*
University of Wisconsin-Madison *Madison, U.S.*

- **Courses**: MATH623 Complex Analysis; MATH 542 Modern Algebra
- **Responsibility**: Grading assignments of the courses and offering feedback and comments.

Data Analysis Intern *Mar. 2021 - Jun. 2021*
Haoduosujiao Network Technology Co., LTD (start-up) *Hangzhou, China*

- Participated in business data analysis, data infrastructure and data product development.

- Conducted thematic data analysis and research, as well as exported support and solutions from the data perspective.

Skills & Interests

Language	Chinese; English
Programming	Python, Matlab, SQL, C/C++, R
Software & Tools	PyTorch, LaTeX, Git, Linux, Gephi, Adobe Illustrator, etc.
Research Interests	Applied mathematics; Scientific computing; Numerical analysis; Data mining; Machine learning (Graph Neural Network); Network, etc.

Projects

Implicit-Explicit LDG Method for Nonlinear Schrödinger Equation
Mentor: Prof. Xinghui Zhong *Jul. 2021 - Jun. 2022*

- **Topic**: Local discontinuous Galerkin method with implicit-explicit multistep time discretization for solving the nonlinear Schrödinger equation
- **Key Words**: local discontinuous Galerkin method; implicit-explicit time method; multi-step method; Schrödinger equation; error estimate
- Completed theoretical proof of the optimal error estimates in Implicit-Explicit local Discontinuous Galerkin method (IMEXLDG) with two-step BDF.
- Performed numerical experiments to verify the accuracy and efficiency of the IMEXLDG method with two-step BDF.

A Novel Algorithms of Generating Benchmark Graphs for Community Detection
Mentor: Prof. Weihong Bi *Jun. 2021 - Present*

- **Topic**: A novel algorithm to generate artificial benchmark graphs with ground-truth community structure planted for community detection, especially for the signed graphs.
- **Key Words**: graph theory, network analysis, clustering algorithms, data mining, machine learning with graphs (Graph Neural Network), etc.
- Completed the algorithm design and implementation.
- In preparation of organizing a research paper.

Awards & Honors

The Third Scholarship of Zhejiang University	*2017-2018*
The Outstanding Performance in Academic of Zhejiang University	*2017-2018*
The One-Star Volunteer in Zhejiang University	*2017-2021*