ZISHANG LI

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Education

The Chinese University of Hong Kong (CUHK) 08/2021 - Present
PhD candidate in *Mathematics* Supervisor: Prof. Eric T. Chung
Coursework: Finite element method, Finite difference methods, Numerical algebra, High performance computing, Data science, Mathematics of Machine Learning

Northwestern Polytechnical University (NWPU) 08/2017 - 06/2021
Bachelor of Science Degree in *Information and Computing Science*
GPA: 87.8/100; Ranking: 3/46.
Awards: Outstanding Graduates of NWPU, 2021; First-class Scholarship of NWPU, 2018 & 2019 & 2020; Outstanding Student Award of NWPU, 2018 & 2019 & 2020; Wu Yajun Scholarship of NWPU (Top 3%), 2018 & 2019.

Imperial College London 07/2019 - 08/2019
Short term exchange in *Data Science Institute* Supervisor: Prof. Yike Guo
Coursework: Data science, Big data computing and management, Data visualisation.

Experience

An iterative constraint energy minimizing generalized multiscale FEM for contact problem
– **Publication: Zishang Li**, Changqing Ye, and Eric T. Chung. An iterative constraint energy minimizing generalized multiscale finite element method for contact problem. *arXiv preprint arXiv:2406.02909* (2024). [**Under Review**]

- Proposed and implemented an iterative multiscale FEM to solve contact problem in heterogeneous medium.
- Optimized constrained minimizing problem by a penalty method and applied a semismooth Newton algorithm to handle nonlinear and nonsmooth components.
- Developed the CEM-GMsFEM solver iteratively, incorporating special boundary correctors and multiscale spaces to achieve optimal convergence rates.
- Implemented the method using Python libraries, including NumPy, SciPy, and leveraged BLAS, LAPACK, and SPARSE operations for enhanced performance.

A discontinuous Galerkin based multiscale method for heterogeneous elastic wave equations
– **Publication:** Zhongqian Wang, Eric T. Chung, and **Zishang Li**. A discontinuous Galerkin based multiscale method for heterogeneous elastic wave equations. *Journal of Computational Physics* (2024): 113294.

- Developed a local multiscale model reduction strategy for the elastic wave equation in heterogeneous media.
- Utilized the interior penalty discontinuous Galerkin method to couple multiscale basis functions that capture important heterogeneous media information.
- Demonstrated that the proposed method is stable and spectral convergent, supported by both theoretical analysis and practical applications.

The Data Challenge on Stock Return Prediction by Qube Research & Technologies 07/2024 - 08/2024

- Ranked top 8% place in the competition as the main contributor.
- Handled the missing data; analyzed the characteristic information for stocks across various industries; investigated the nonlinear relationship and the volume-price information of stocks on time series.
- Implemented grouped training based on the presence of missing values; developed stock return prediction classification models using tree-based algorithms such as XGBoost, LightGBM, and Random Forest.

Leadership & Activities

Society for Industrial and Applied Mathematics Student Chapter CUHK
President 08/2023 - Present

2024 CUHK SIAM Student Annual Workshop **Chair, Organizing Committee**

- Organized a workshop to facilitate communication and knowledge sharing among mathematics graduates and current students and enhance collaboration between students and enterprise.
- Invited distinguished speakers, including 3 university professors, 2 postdoctoral researchers, and 2 experts from Huawei Hong Kong Research Center, as well as a successful alumnus from the industry.

Mini-symposium in The 17th SIAM East Asian Section Conference **Secretary, Organizing Committee**

- Invited over 20 PhD students from various countries and regions to present their research, fostering discussions on PDEs, computational mathematics, optimization, and high-performance computing, etc.
- Encouraged collaboration, showcasing recent developments in applied mathematics and computational science.

Skills & Interests

Programming and Tools: Python, LaTeX, Matlab, Git.
Language: Native Speaker of Mandarin Chinese, Fluent in English, Proficient in Cantonese.
Interests: Photography, Photoshop, Lightroom