

Limin Ma

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PARTICULARS

EDUCATION

Pennsylvania State University
Postdoc in Department of Mathematics
Supervisor: Prof. Jinchao Xu

State College, USA
Aug.2018 - present

Peking University
Ph.D. in Department of Scientific and Engineering Computing
Supervisor: Prof. Jun Hu

Beijing, China
Sep.2013 - Jul.2018

Wuhan University
B.S. in Department of Computational Mathematics

Hubei, China
Sep.2009 - Jul.2013

RESEARCH INTERESTS

My research interest regards the approximation by finite elements of partial differential equations. In particular, I worked on the following areas:

- Nonconforming finite element methods for eigenvalue problems
- Superconvergence of nonconforming elements and mixed elements
- Finite element methods for linear elasticity problems

DISSERTATION

Title: "High accuracy methods for eigenvalue problems by nonconforming elements"
Advisor: Prof. Jun Hu

My thesis concentrates on the analysis of high accuracy methods and proposes some algorithms to improve the accuracy of eigenvalues by finite element methods. It includes:

- The first asymptotic expansions of eigenvalues by the nonconforming Crouzeix-Raviart element and the enriched Crouzeix-Raviart element
- Design two types of asymptotically exact a posteriori error estimators
- Propose the penalized Crouzeix-Raviart element which aims to improve the accuracy of large amounts of eigenvalues
- Prove an optimal superconvergence result for two nonconforming elements

PUBLICATIONS

1. J. Hu and L. Ma., "A Penalized Crouzeix-Raviart Element Method for Second Order Elliptic Eigenvalue Problems", *Journal of Scientific Computing*, 74(3):1457-1479, 2018.
2. J. Hu and L. Ma., "Asymptotically Exact A Posteriori Error Estimates of Eigenvalues by the Crouzeix-Raviart Element and Enriched Crouzeix-Raviart Element", *SIAM Journal on Scientific Computing*, 42(2): A797-A821, 2020.
3. J. Hu, L. Ma. and R. Ma, "Optimal Superconvergence Analysis for the Crouzeix-Raviart and the Morley elements", *arXiv:1808.09810v2*, submitted to *Advances in Computational Mathematics*, 2019.
4. J. Hu and L. Ma., "Asymptotic Expansions of Eigenvalues by both the Crouzeix-Raviart and Enriched Crouzeix-Raviart elements", *arXiv:1902.09524v2*, submitted to *Mathematics of Computation*, in revision, 2020.

5. Q. Hong, J. Hu, L. Ma and J. Xu. “Extended Galerkin Method for Linear Elasticity with Strongly Symmetric Stress Tensor”, *arXiv:2002.11664*, submitted to *Numerische Mathematik*, 2020
6. L. Ma. “Superconvergence of Discontinuous Galerkin Methods for the Scaler Elliptic Problems and Linear Elasticity Problems”, *arXiv:2010.10507*, submitted to *Journal of Scientific Computing*, 2020
7. Q. Hong, J. Hu, L. Ma and J. Xu. “Extended Galerkin Method for Stokes Problems”, in preparation.
8. L. Ma. “Asymptotic Expansions of Eigenvalues by the Morley Element for the Fourth Order Elliptic Problems”, in preparation.

TEACHING EXPERIENCE

- **Instructor.** MATH 230: Calculus and Vector Analysis, Spring 2020, Pennsylvania State University.
- **Instructor.** MATH 251: Ordinary and Partial Differential Equations , Spring 2019, Pennsylvania State University.
- **Teaching Assistant.** MATH 597(section 003): Special Topics, Prof. Jinchao Xu, Spring 2019, Pennsylvania State University.
- **Teaching Assistant.** MATH 556: Finite Element Methods , Prof. Jinchao Xu, Fall 2018, Pennsylvania State University.
- **Teaching Assistant.** An Introduction to Applied Mathematics, Prof. Jun Hu, Fall 2016, Peking University

ACADEMIC ACTIVITIES

- Attend the 2019 AMS-JMM at Baltimore, January 16-19, 2019.
- Attend the fall 2018 FE Circus at Delaware, November 9-10, 2018.
- Co-organizer of 4th Graduate Forum on Numerical Methods for Partial Differential Equations, Peking University, China, July 2016.
- Co-organizer of 2nd Beijing Graduate Forum on Computational Mathematics, Peking University, China, August 2015

ACADEMIC HONORS

- Award for Scientific Research, Peking University, 2017.
- Special Scholarship for Scientific Research , Peking University, 2017.

PRESENTATIONS

1. *15th Annual Meeting of China Society for Industrial and Applied Mathematics*, Qingdao, China, October 2017.
2. *11th National Conference on Computational Mathematics*, Xi'an, China, July 2017.
3. *9th National Conference on Finite Elements*, E'mei, China, August 2016.
4. *4th Graduate Forum on Numerical Methods for Partial Differential Equations*, Peking University, China, July 2016.

REFERENCES

Prof. **Jinchao Xu** (Postdoc Advisor)
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Prof. **Jun Hu** (Ph.D. Thesis Advisor)
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