Weifeng Qiu

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Education

Ph.D. in Computational and Applied Mathematics, the University of Texas at Austin 2006 - 2010

◇ Advisor: Leszek Demkowicz, Serge Prudhomme

M.S. in Mathematics, University of Alabama in Huntsville 2005 - 2006

B.S. in Mathematics, Shanghai Normal University 1996 - 2000

Employment

Associate Professor July 2018 - present
Department of Mathematics, City University of Hong Kong

Assistant Professor August 2012 - June 2018
Department of Mathematics, City University of Hong Kong

IMA Postdoctoral associate 2010 - 2012
Institute for Mathematics and its applications, University of Minnesota, Minneapolis
◇ Mentor: Bernardo Cockburn

Research Interest

Numerical analysis, discontinuous Galerkin methods, time-harmonic problems with high wave number, fully nonlinear PDEs

Grants

◇ RGC GRF-11300621 "Hybridizable Discontinuous Galerkin Approximation for the Biharmonic Operator and Some Applications", PI, 2022-2024
◇ RGC GRF-11302219 "Hybridizable Discontinuous Galerkin Approximation for Second Order Elliptic Operator in Non-divergence Form and Some Applications", PI, 2020-2022
◇ RGC GRF-11304017 "Hybridizable discontinuous Galerkin approximation of the Maxwell operator and some applications", PI, 2018-2020
◇ RGC GRF-11302014 "New HDG methods for fluid dynamics and continuum mechanics", PI, 2015-2018
◇ RGC ECS-109713 "Discontinuous Petrov-Galerkin Methods for Partial Differential Equations with Singular Perturbation", PI, 2014-2016
◇ CityU SRG-7200324 "Discontinuous Petrov-Galerkin Methods for Partial Differential Equations", PI, 2013-2015

Publications

Peer Refereed Journals (under review):

1. X. Zhong and W. Qiu(202x). Analysis of a Narrow-Stencil Finite Difference Method for Approximating Viscosity Solutions of Fully Nonlinear Second Order Parabolic PDEs. submitted.
2. W. Qiu, J. Ren, K. Shi and Y. Xu(202x). A Non-gradient DG method for second-order Elliptic Equations in the Non-divergence Form. submitted.
3. S. Ma, W. Qiu and X. Yang (202x). Error estimates for the scalar auxiliary variable (SAV) scheme to the Cahn-Hilliard equation. submitted.

Peer Refereed Journals (published/accepted):

4. B. Li, W. Qiu, Y. Xie and W. Yu (202x). Weak discrete maximum principle of isoparametric finite element methods in curvilinear polyhedra. *Mathematics of Computation*, accepted.
5. X. Zhong and W. Qiu (202x). Spectral analysis of a mixed method for linear elasticity. *SIAM Journal on Numerical Analysis*, accepted.
6. Y. Huang W. Qiu and W. Sun (202x). New analysis of Mixed finite element methods for incompressible Magnetohydrodynamics. *Journal of Scientific Computing*, accepted.
7. H. Gao, W. Qiu and W. Sun (2023). New analysis of mixed FEMs for dynamical incompressible magnetohydrodynamics. *Numerische Mathematik*, 153, 327–358.
8. H. Gao and W. Qiu (2023). A new error analysis and post-processing technique of the lowest-order Raviart–Thomas mixed finite element method for parabolic problems. *Computers and Mathematics with Applications*, 133, 174-188.
9. W. Qiu and L. Tang (2023). Global $W^{2,p}$ estimates for elliptic equations in the non-divergence form. *Proceedings of American Mathematical Society*, 151(2), 763-770.
10. H. Chen, J. Li and W. Qiu (2022). A C^0 interior penalty method for mth-Laplace equation. *ESAIM: Mathematical Modelling and Numerical Analysis*, 56(6), 2081-2103.
11. H. Chen, W. Qiu and A. Pani (2022). A mixed finite element scheme for biharmonic equation with variable coefficient and von Kármán equations. *Communications in Computational Physics*, 31(5), 1434-1466.
12. B. Li, W. Qiu and Z. Yang (2022). Convergent post-processed discontinuous Galerkin method for incompressible flow with variable density. *Journal of Scientific Computing*, 91(2).
13. G. Chen, W. Qiu and L. Xu (2021). Analysis of an interior penalty DG method for the quad-curl problem . *IMA Journal of Numerical Analysis*, 41(4), 2990-3023.

14. H. Gao and W. Qiu (2021). The Pointwise Stabilities of Piecewise Linear Finite Element Method on Non-obtuse Tetrahedral Meshes of Nonconvex Polyhedra. *Journal of Scientific Computing*, 87(2).
15. H. Chen, J. Li, W. Qiu and C. Wang (2021). A Mixed Finite Element Scheme for Quad-Curl Source and Eigenvalue Problems. *Communications in Computational Physics*, 29(4), 1125-1151.
16. W. Qiu and S. Zhang (2020). Adaptive First-Order System Least-Squares Finite Element Methods for Second Order Elliptic Equations in Non-Divergence Form. *SIAM Journal on Numerical Analysis*, 58(6), 3286-3308.
17. W. Qiu and K. Shi (2020). Analysis of a semi-implicit structure-preserving finite element method for the nonstationary incompressible Magnetohydrodynamics equations. *Computers and Mathematics with Applications*, 80(10), 2150-2161.
18. W. Qiu and L. Tang (2020). A note on the Monge-Ampère type equations with general source terms. *Mathematics of Computation*, 89(326), 2675-2706.
19. W. Qiu and L. Tang (2020). On a class of generalized Monge-Ampère type equations. *Communications in Contemporary Mathematics*, 22(5).
20. W. Qiu and K. Shi (2020). A Mixed DG method and an HDG method for incompressible magnetohydrodynamics. *IMA Journal of Numerical Analysis*, 40(2), 1356-1389.
21. K. Hu, W. Qiu, K. Shi (2020). Convergence of a B-E based finite element method for MHD models on Lipschitz domains. *Journal of Computational and Applied Mathematics*, 368, 145-162.
22. W. Qiu and K. Shi (2019). Analysis on an HDG method for the p-Laplacian equations. *Journal of Scientific Computing*, 80, 1019-1032.
23. H. Gao and W. Qiu (2019). A semi-implicit energy conserving finite element method for the dynamical incompressible magnetohydrodynamics equations. *Computer Methods in Applied Mechanics and Engineering*, 346, 982-1001.
24. G Fu, Y. Jin and W. Qiu (2019). Parameter-free superconvergent $H(div)$-conforming HDG methods for the Brinkman equations. *IMA Journal of Numerical Analysis*, 39(6), 957-982.
25. B. Cockburn, G. Fu and W. Qiu (2018). Discrete H^1-inequalities for spaces admitting M-decompositions. *SIAM Journal on Numerical Analysis*, 56(6), 3407-3429..
26. H. Gao and W. Qiu (2018). Error analysis of mixed finite element methods for nonlinear parabolic equations. *Journal of Scientific Computing*, 77, 1660-1678.
27. H. Chen, W. Qiu and K. Shi (2018). A priori and computable a posteriori error estimates for an HDG method for the coercive Maxwell equations. *Computer Methods in Applied Mechanics and Engineering*, 333, 287-310.
28. W. Qiu, J. Shen and K. Shi (2018). An HDG method for linear elasticity with strong symmetric stresses. *Mathematics of Computation*, 87(309), 69-93.

29. B. Cockburn, G. Fu and W. Qiu (2017). A note on the devising of superconvergent HDG methods for Stokes flow by M-decompositions. *IMA Journal of Numerical Analysis*, 37(2), 730-749.
30. A. Cesmelioglu, B. Cockburn and W. Qiu (2017). Analysis of a Hybridizable Discontinuous Galerkin method for the steady-state incompressible Navier-Stokes equations. *Mathematics of Computation*, 86(306), 1643-1670.
31. P. Lu, H. Chen and W. Qiu (2017). An absolutely stable *hp*-HDG method for the time-harmonic Maxwell equations with high wave number. *Mathematics of Computation*, 86(306), 1553-1577.
32. E.T. Chung and W. Qiu (2017). Analysis of a SDG method for the incompressible Navier-Stokes equations. *SIAM Journal on Numerical Analysis*, 55(2), 543-569.
33. H. Chen, W. Qiu, K. Shi and M. Solano (2017). A Superconvergent HDG method for the Maxwell equations. *Journal of Scientific Computing*, 70(3), 1010-1029.
34. H. Chen and W. Qiu (2017). A first order system least squares method for the Helmholtz equation. *Journal of Computational and Applied Mathematics*, 309, 145-162.
35. W. Qiu, M. Solano and P. Vega (2016). A high order HDG method for curved-interface problems via approximations from straight Triangulations. *Journal of Scientific Computing*, 69(3), 1384-1407.
36. W. Qiu and K. Shi (2016). A superconvergent HDG method for the incompressible Navier–Stokes equations on general polyhedral meshes. *IMA Journal of Numerical Analysis*, 36(4), 1943-1967.
37. W. Qiu, M. Wang and J. Zhang (2016). Direct computation of stresses in linear elasticity. *Journal of Computational and Applied Mathematics*, 292, 363-368.
38. W. Qiu and K. Shi (2016). An HDG method for convection diffusion equation. *Journal of Scientific Computing*, 66(1), 346-357.
39. H. Chen, J. Li and W. Qiu (2016). Robust a posteriori error estimates for HDG method for convection–diffusion equations. *IMA Journal of Numerical Analysis*, 36(1), 437-462.
40. Z. Wang, W. Qiu, Y. Yang, C.T. Liu (2015). Atomic-size and lattice-distortion effects in newly developed high-entropy alloys with multiple principal elements. *Intermetallics*, 64, 63-69.
41. D. Arnold, G. Awanou and W. Qiu (2015). Mixed finite elements for elasticity on quadrilateral meshes. *Advances in Computational Mathematics*, 41(3), 553-572.
42. G. Fu, W. Qiu and W. Zhang (2015). An analysis of HDG methods for convection-dominated diffusion problems. *ESAIM: Mathematical Modelling and Numerical Analysis*, 49(1), 225-256.

43. H. Chen, G. Fu, J. Li and W. Qiu (2014). First order least squares method with weakly imposed boundary condition for convection dominated diffusion problems. *Computers and Mathematics with Applications*, 68(12), 1635-1652.

44. J. Chan, J.A. Evans and W. Qiu (2014). A dual Petrov–Galerkin finite element method for the convection–diffusion equation. *Computers and Mathematics with Applications*, 68(11), 1513-1529.

45. B. Cockburn, W. Qiu and M. Solano (2014). A priori error analysis for HDG methods using extensions from subdomains to achieve boundary conformity. *Mathematics of Computation*, 83(286), 665-699.

46. J. Gopalakrishnan and W. Qiu (2014). An analysis of the practical DPG method. *Mathematics of Computation*, 83(286), 537-552.

47. B. Cockburn and W. Qiu (2014). Commuting diagrams for the TNT elements on cubes. *Mathematics of Computation*, 83(286), 603-633.

48. J. Bramwell, L. Demkowicz, J. Gopalakrishnan and W. Qiu (2012). A locking-free *hp* DPG method for linear elasticity with symmetric stresses. *Numerische Mathematik*, 122(4), 671-707.

49. B. Cockburn, W. Qiu and K. Shi (2012). Superconvergent HDG methods on isoparametric elements for second-order elliptic problems. *SIAM Journal on Numerical Analysis*, 50(3), 1417-1432.

50. J. Gopalakrishnan and W. Qiu (2012). Partial expansion of a Lipschitz domain and some applications. *Frontiers of Mathematics in China*, 7(2), 249-272.

51. B. Cockburn, W. Qiu and K. Shi (2012). Conditions for superconvergence of HDG methods for second-order elliptic problems. *Mathematics of Computation*, 81(279), 1327-1353.

52. W. Qiu and L. Demkowicz (2011). Mixed hp-finite element method for linear elasticity with weakly imposed symmetry: stability analysis. *SIAM Journal on Numerical Analysis*, 49(2), 619-641.

53. W. Qiu and L. Demkowicz (2011). Mixed variable order h-finite element method for linear elasticity with weakly imposed symmetry. Curvilinear elements in 2D. *Computational Methods in Applied Mathematics*, 11(4), 510-539.

54. W. Qiu and L. Demkowicz (2009). Mixed hp-finite element method for linear elasticity with weakly imposed symmetry. *Computer Methods in Applied Mechanics and Engineering*, 198(47), 3682-3701.

55. L. Demkowicz, P. Gatto, W. Qiu and A. Joplin (2009). G^1-interpolation and geometry reconstruction for higher order finite elements. *Computer Methods in Applied Mechanics and Engineering*, 198(13), 1198-1212.

56. S. Wu and W. Qiu (2009). Nonlinear transient dynamic analysis by explicit finite element with iterative consistent mass matrix. *Communications in numerical methods in engineering*, 25(3), 201-217.

57. P. Yu, W. Qiu and D.Z. Pan (2008). Fast lithography image simulation by exploiting symmetries in lithography systems. *IEEE Transactions on Semiconductor Manufacturing*, 21(4), 638-645.

58. M. Friedman and W. Qiu (2008). On the location and continuation of Hopf bifurcations in large-scale problems. *International Journal of Bifurcation and Chaos*, 18(5), 1589-1597.