Curriculum Vitae of Kwang-Yeon Kim

Contact Info

- Current Address : Department of Mathematics
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Education

- 1994.02, B.S. in Mathematics, Korea Advanced Institute of Science and Technology
- 1996.02. M.S. in Mathematics, Korea Advanced Institute of Science and Technology
- 2002.08. Ph.D. in Mathematics, Korea Advanced Institute of Science and Technology
  Thesis title: Mixed finite volume methods on quadrilateral grids for second-order elliptic problems (Advisor: Prof. Do-Young Kwak)

Professional Experience

2015.03-present	Associate Professor, Department of Mathematics, Kangwon National University, Chuncheon, South Korea.
2011.03-2015.02	Assistant Professor, Department of Mathematics, Kangwon National University, Chuncheon, South Korea.
2008.03-2011.02	Full-time Lecturer, Department of Mathematics, Kangwon National University, Chuncheon, South Korea.
2007.08-2008.02	Postdoctoral Researcher, Department of Mathematics, Ajou University, Suwon, South Korea.
2006.03-2007.02	Lecturer, Department of Applied Mathematics, Sejong University, Seoul, South Korea.
2004.07-2005.07	Postdoctoral Researcher, Department of Aerospace Engineering, Korea Advanced Institute of Science and Technology
2003.05-2004.04	Research Associate, Department of Mathematics Southern Methodist University, Dallas, USA.
2002.08-2003.03	Postdoctoral Researcher, Department of Mathematics, Korea Advanced Institute of Science and Technology.

Research Interests

- Numerical analysis and scientific computing
- Finite element methods, finite volume methods, discontinuous Galerkin methods
- A priori and a posteriori error analysis
- Darcy equation, Stokes equation, linear elasticity equation

Research Grants

2011.09-2013.08 *A Fully Computable Upper Bounds for the Darcy-Stokes Equation*, National Research Foundation of Korea (NRF), 66,040,000 won.

2009.05-2011.04 *A Posteriori Error Estimates for Linear Elasticity and Stokes Problems* National Research Foundation of Korea (NRF), 105,441,000 won.

2008.07-2009.06 *Efficient Numerical Algorithm for Locally Mass-Conservative Discretization of Darcy's Law*, Korea Research Foundation (KRF), 21,400,000 won.

2008.07-2009.06 *Adaptive Finite Element Methods for Newtonian and Non-Newtonian Fluid Flows*, Korea Research Foundation (KRF), 58,262,000 won. (as collaborator)

2008.05-2009.05 *Mixed Finite Volume Method for Signorini's Problem*, Kangwon National University, 9,000,000 won.

2003.05-2004.04 *Discontinuous Finite Element Methods with Application to Fluid Flow in Porous Media*, Korea Science & Engineering Foundation (KOSEF), $20,172.

Publication in Journals

1. K.-Y. Kim, *Robust a posteriori error estimator for lowest-order finite element methods of interface problems*, J. KSIAM 20 (2016), no. 2, 137-150.
2. K.-Y. Kim, *Postprocessing for guaranteed error bound based on equilibrated fluxes*, J. Korean Math. Soc. 52 (2015), no. 2, 891-906.
3. K.-Y. Kim, *Hierarchical error estimators for lowest-order mixed finite element methods*, Korean J. Math. 22 (2014), no. 3, 429-441.
4. K.-Y. Kim, *Fully computable a posteriori error estimates for the Stokes equation without the global inf-sup constant*, Comput. Math. Appl. 67 (2014), no. 3, 681-691.
5. K.-Y. Kim, *On the asymptotic exactness of an error estimator for the lowest-order Raviart-Thomas mixed finite element*, Korean J. Math. 21 (2013), no. 3, 293-304.
6. K.-Y. Kim, *Flux reconstruction for the P2 nonconforming finite element method with application to a posteriori error estimation*, Appl. Numer. Math. 62 (2012), no. 12, 1701-1717.
7. K.-Y. Kim, *Guaranteed a posteriori error estimator for mixed finite element methods of elliptic problems*, Appl. Math. Comp. 218 (2012), no. 24, 11820-11831.
8. K.-Y. Kim, *A posteriori error estimator for linear elasticity based on nonsymmetric stress*

tensor approximation, J. KSIAM 16 (2012), no. 1, 1-13.

9. K.-Y. Kim, *Guaranteed a posteriori error estimator for mixed finite element methods of linear elasticity with weak stress symmetry*, SIAM J. Numer. Anal. 49 (2011), no. 6, 2364-2385.
10. H.-C. Lee and K.-Y. Kim, *A posteriori error estimators for stabilized P1 nonconforming approximation of the Stokes problem*, Comput. Methods Appl. Mech. Engrg. 199 (2010), no. 45-48, 2903-2912.
11. K.-Y. Kim and H.-C. Lee, *A posteriori error estimators for nonconforming finite element methods of linear elasticity problem*, J. Comput. Appl. Math. 235 (2010), no. 1, 186-202.
12. K.-Y. Kim, *Explicit bounds for the two-level preconditioner of the $P1$ discontinuous Galerkin method on rectangular meshes*, J. KSIAM 13 (2009), no. 4, 267-280.
13. K.-Y. Kim, *Mixed finite volume method on non-staggered grids for the Signorini problem,* J. KSIAM 12 (2008), no. 4, 249-260.
14. Kwang Y. Kim, *A posteriori error estimators for locally conservative methods of nonlinear elliptic problem*, Appl. Numer. Math. 57 (2007), no. 9, 1065-1080.
15. Kwang Y. Kim, *A posteriori error analysis for locally conservative mixed methods*, Math. Comp. 76 (2007), no. 257, 43-66.
16. Kwang Y. Kim, *Analysis of some low-order nonconforming mixed finite elements for linear elasticity problem*, Numer. Methods Partial Differential Equations 22 (2006), no. 3, 638-660.
17. Kwang Y. Kim, *New mixed finite volume methods for second order elliptic problems*, ESAIM: M2AN 40 (2006), no. 1, 123-147.
18. Kwang Y. Kim, *Error estimates for a mixed finite volume method for the p-Laplacian problem*, Numer. Math. 101 (2005), no. 1, 121-142.
19. Kwang Y. Kim, *Mixed finite volume method for nonlinear elliptic problems*, Numer. Methods Partial Differential Equations 21 (2005), no. 4, 791-809.
20. So-Hsiang Chou, Do Y. Kwak and Kwang Y. Kim, *Mixed finite volume methods on non-staggered quadrilateral grids for elliptic problems*, Math. Comp. 72 (2003), no. 242, 525-539.
21. So-Hsiang Chou, Do Y. Kwak and Kwang Y. Kim, *Flux recovery from primal hybrid finite element methods*, SIAM J. Numer. Anal. 40 (2002), no 2, 403-415.
22. So-Hsiang Chou, Do Y. Kwak and Kwang Y. Kim, *A general framework for constructing and analyzing mixed finite volume methods on quadrilateral grids: the overlapping covolume case*, SIAM J. Numer. Anal. 39 (2001), no 4, 1170-1196.
23. Do Y. Kwak and Kwang Y. Kim, *Mixed covolume methods for quasi-linear second-order elliptic problems*, SIAM J. Numer. Anal. 38 (2000), no 4, 1057-1072.

Conference Talks

1. *Recovery-based error estimator for lowest-order finite element methods*, 2015 KMS Annual Meeting, Yonsei University, Seoul, October 23-25, 2015.
2. *Postprocessing for P1 conforming finite element method*, KSIAM 2015 Spring Conference,

Sungkyunkwan University, Suwon, May 29-30, 2015.

3. *Superconvergence, postprocessing and a posteriori error estimation*, KSIAM 2014 Annual Meeting, Seogwipo, November 21-22, 2014.
4. *Asymptotic exactness of a posteriori error estimators for the lowest-order Raviart-Thomas mixed finite element method*, International Workshop on Computational Mathematics - Advances in Computational PDEs (ICM 2014 Satellite Conference & 2014 NIMS Hot Topics Workshop), Yonsei University, August 9-12, 2014.
5. *Residual-based a posteriori error estimators for the Stokes equation*, KSIAM 2013 Annual Meeting, Seogwipo, November 22-23, 2013.
6. *On the asymptotic exactness of an error estimator for a mixed finite element method*, The Asian Mathematical Conference 2013, Busan BEXCO, July 1-4, 2013.
7. *Improved a posteriori error estimates for the Stokes equation*, International Workshop on Computational Mathematics: Advances in Computational PDEs, Yonsei University, March 27-28, 2013.
8. *Flux reconstruction for low-order nonconforming finite element methods*, 4th China-Japan-Korea Conference on Numerical Mathematics, Otsu City, Japan, August 25-28, 2012.
9. *A posteriori error estimator for mixed finite element methods of linear elasticity*, International Conference on Computational Mathematics: Advances in Computational PDEs, Yonsei University, July 11-13, 2012.
10. *A posteriori error estimator for the P2 nonconforming finite element method*, International Conference on Boundary And Interior Layers (BAIL) 2012, POSTECH, February 6-10, 2012.
11. *Fully computable upper bounds for finite element approximation of linear elasticity*, KSIAM 2011 Annual Meeting, Seogwipo, November 25-27, 2011.
12. *Guaranteed a posteriori error estimator for mixed finite element methods*, 1st Joint Meeting of the CMS and the KMS, Southwest University (Chongqing), China, May 18-22, 2010.
13. *A posteriori error estimator for quadrilateral nonconforming finite element method of linear elasticity*, 6th International Conference on Scientific Computing and Applications, Pusan National University, June 2-5, 2008.
14. *Efficient a posteriori error estimators for adaptive finite element methods*, Korean Mathematical Society, Keimyung University, April 26, 2008.
15. *Additive Schwarz preconditioner for interior penalty methods*, Workshop on Dynamical Systems and Related Fields, Ajou University, February 18-19, 2008.
16. *A posteriori error estimators for locally conservative methods*, The 3rd East Asia SIAM Conference, Xiamen University, China, November 2-5, 2007.
17. *A posteriori error estimators for nonconforming finite element methods of linear elasticity problem*, Korean Mathematical Society, KAIST, October 20-21, 2007.
18. *A posteriori error estimators for $P1$ nonconforming approximation of quasi-Newtonian Stokes flows*, KSIAM 2005 Conference in Spring, Seoul National University, May 20-21, 2005.

19. *A posteriori error analysis for locally conservative mixed methods*, KSIAM 2004 Annual Meeting and Conference, Gyeongju, South Korea, December 3-4, 2004.

Teaching Experience

Kangwon National University

Spring 2016	Numerical Algorithm, Advanced Differential Equations
	Special Topics in Numerical Analysis
Fall 2015	Advanced Calculus II, Differential Equations
	Optimization Theory
Spring 2015	Advanced Calculus I, Probability and Statistics
	Advanced Differential Equations
Fall 2014	Quantitative Reasoning
	Advanced Calculus II
Spring 2014	Advanced Calculus I, Numerical Analysis I
	Harmonic Analysis II (graduate)
Fall 2013	Number Theory
	Mathematical Physics II (graduate)
Spring 2013	Calculus I, Matrix and Its Applications, Numerical Analysis I
	Mathematical Physics I (graduate)
Fall 2012	Number Theory
	Boundary Value Problems II (graduate)
Spring 2012	Algebra and Geometry, Matrix and Its Applications
	Partial Differential Equations I (graduate)
Fall 2011	Advanced Calculus II, Set Theory II
	Mathematics and Computer Algorithm
Spring 2011	Advanced Calculus I, Set Theory I
	Numerical Linear Algebra (graduate)
Fall 2010	Numerical Analysis
	Boundary Value Problems I (graduate)
Spring 2010	Advanced Calculus I, Methods of Applied Mathematics
	Advanced Analysis I (graduate)
Fall 2009	Numerical Analysis, Real Analysis II
	Advanced Analysis II (graduate)
Spring 2009	Calculus I, Advanced Calculus I, Methods of Applied Mathematics,
	Numerical Analysis (graduate)
Fall 2008	Linear Algebra II
	Partial Differential Equations (graduate)
Spring 2008	Calculus I, Linear Algebra I, Methods of Applied Mathematics

Sejong University

Fall 2006	Calculus I & II

Spring 2006 Calculus I & II

Korea Advanced Institute of Science and Technology

Fall 2004 Nonlinear Partial Differential Equations (graduate course)