Curriculum Vitae

Zhenli Xu

ADDRESS

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RESEARCH INTERESTS

- Computational biology, Macroscopic solvation models, Electrostatics
- Molecular dynamics, Electronic structure calculations
- Fast algorithms, Artificial boundary/ Boundary integral methods, Spectral methods
- Conservation laws, Computational wave propagation

EDUCATION

University of Science and Technology of China, Hefei, China, (09/2004-07/2007)

Ph.D. in Computational Mathematics, July, 2007 (Advisor: Professor Houde Han)

Dissertation: Nonlinear Artificial Boundary Conditions

University of Science and Technology of China, Hefei, China, (09/1997-07/2003)

M.Sc. in Computational Mathematics, July, 2003

Thesis: Research of Higher Order Numerical Schemes

B.E. (minor degree) in Computer Applications, July, 2001

B.S. in Mathematics, July, 2001

HONORS

- Dean's Excellent Award of the Chinese Academy of Sciences, May, 2007
- Qiu Shi Graduate Scholarship, October, 2006.

PROFESSIONAL EXPERIENCE

8/2007 - date, *Postdoc*, University of North Carolina, Charlotte, NC
9/2006 - 12/2006, *Research Assistant*, Hong Kong Baptist University, Hong Kong
10/2005 - 1/2006, *Research Assistant*, City University of Hong Kong, Hong Kong
3/2005 - 6/2005, *Exchange Research Student*, Hong Kong Baptist University, Hong Kong

PUBLICATIONS

Journal Papers:

1. P. Qin, Z. Xu, W. Cai and D. Jacobs, Image charge methods for a three-dielectric-layer hybrid solvation model of biomolecules, *Commun. Comput. Phys.*, in press.
2. J. Zhang, Z. Xu and X. Wu, Unified approach to split absorbing boundary conditions for nonlinear Schrödinger equations: two dimensional case, *Phys. Rev. E*, in press.
3. Z. Xu and S. Deng and W. Cai, Image charge approximations of reaction fields in solvents with arbitrary ionic strength, *J. Comput. Phys.*, 228(2009), 2092-2099.
4. Z. Xu and W. Cai, Fast spectral collocation method for surface integral equations of potential problems in a spheroid, *Commun. Comput. Phys.*, 6(2009), 625-638

5. W. Cai, Z. Xu and A. Baumketner, A new FFT-based algorithm to compute Born radii in the generalized Born theory of biomolecule solvation, *J. Comput. Phys.*, 227(2008), 10162-10177
6. J. Zhang, Z. Xu and X. Wu, Unified approach to split absorbing boundary conditions for nonlinear Schrödinger equations, *Phys. Rev. E*, 78(2008), 026709
7. P. Zhang, S.C. Wong and Z. Xu, A hybrid scheme for solving a multi-class traffic flow model with complex wave breaking, *Comput. Methods Appl. Mech. Engrg.*, 197(2008), 3816-3827
8. Z. Xu, H. Han and X. Wu, Adaptive absorbing boundary conditions of Schrödinger-type equations: Application to nonlinear and multi-dimensional problems, *J. Comput. Phys.*, 225(2007), 1577-1589.
9. Z. Xu, P. Zhang and R. Liu, δ-mapping algorithm coupled with WENO reconstruction for nonlinear elasticity in heterogeneous media, *Appl. Numer. Math.*, 57(2007),103-116.
10. H. Han and Z. Xu, Numerical solitons of generalized Korteweg-de Vries equations, *Appl. Math. Comput.*, 186 (2007) 483-489.
11. Z. Xu and H. Han, Absorbing boundary conditions for nonlinear Schrödinger equations, *Phys. Rev. E*, 74(2006), 037704.
12. Z. Xu, H. Han and X. Wu, Numerical method for the deterministic Kardar-Parisi-Zhang equation in unbounded domains, *Commun. Comput. Phys.*, 1(3), 2006, 479-493.
13. H. Han, X. Wu and Z. Xu, Artificial boundary method for Burgers' equation using nonlinear boundary conditions, *J. Comput. Math.*, 24(2006), 295-304.
14. Z. Xu, J. He and H. Han, Semi-implicit operator splitting Padé method for higher-order nonlinear Schrödinger equations. *Appl. Math. Comput.*, 179(2006), 596-605
15. L. Kong, R. Liu and Z. Xu, Numerical simulation of interaction between Schrödinger field and Klein-Gordon Field by multisymplectic method, *Appl. Math. Comput.*, 181(2006), 342-350

Proceedings:

16. H.H. Dai and Z. Xu, Impact-induced wave patterns in a slender cylinder composed of a non-convex elastic material, *AIP Conference Proceedings*, 1029(2008), 77-91.
17. Z. Xu and H. Han, Spectral collocation technique for absorbing boundary conditions with increasingly high order approximation, *Lecture Notes in Computer Science*, 4490 (2007), 267-274.

Submitted Papers, and Preprints

18. Z. Xu, W. Cai and A. Baumketner, Optimal integral expressions for effective radii in the generalized Born model of molecular solvation, submitted.
19. Y. Lin, A. Baumketner, S. Deng, Z. Xu, D. Jacobs and W. Cai, An image-based reaction field method for electrostatic interactions in molecular dynamics simulations of aqueous solutions, submitted.

Referee	Applied Mathematics Modelling (12/2006), Applied Mathematics and Computation (1/2008), International Journal of Computer Mathematics (9/2008), International Journal of Numerical Analysis and Modelling (4/2009)
Seminars, Workshops/ Conferences	1. 2/2009, Shanghai Jiao Tong University. Contribute a talk on fast electrostatics computation. 2. 2/2009, University Science and Technology of China, Hefei. Contribute a talk on fast electrostatics computation. 3. 2/2009, Shanghai Institute of Applied Mathematics and Mechanics, Shanghai University. Contribute a talk on fast electrostatics computation. 4. 9/2008, Workshop on Mathematical and Algorithmic Challenges in Electronic Structure Theory in IMA Annual Program *Mathematics and Chemistry*, UMN, Minnesota. Contribute a poster entitled "An FFT-based algorithm for the generalized Born theory of biomolecule solvation". 5. 9/2008, Kickoff Tutorials & Workshop of 2008-09 Program on Sequential Monte Carlo Methods at SAMSI, Research Triangle Park, NC 6. 6/2007, International Conference on Spectral and High Order Methods, Beijing. Contribute a talk on adaptive and spectral collocation techniques for absorbing boundary conditions. 7. 5/2007, International Conference on Computational Science, Beijing. Contribute a talk on high-order absorbing boundary conditions. 8. 6/2006, USTC, Hefei. Contribute a talk on δ-mapping algorithm. 9. 4/2006, IAPCM, Beijing. Contribute a talk on δ-mapping algorithm.
Computational Experience	Programming languages: C/C++, Fortran, Matlab Operating systems: Windows, Linux, Unix Molecular dynamics: MOL, CHARMM Softwares: Mathematica, Tecplot, Latex
References	Available upon request