Tianran Chen

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Education

Ph.D. Applied Mathematics, Michigan State University, 2012.

Dissertation: *Projective path tracking for homotopy continuation method*

Advisor: Tien-Yien Li

B.A. Computer Science, Western Connecticut State University, 2005.

Experience

Michigan State University, Postdoctoral Research Instructor, 2012–2014

Michigan State University, Research and Teaching Assistant, 2006–2012

G3 Acoustical Engineering, Software Engineer, March 2005 – October 2005

Western Connecticut State University, Research/Teaching Assistant, 2003–2005

Western Connecticut State University, R. S. Young Library, Assistant/Programmer, 2002–2004

Honors & Awards

2010 Dr. Paul & Wilma Dressel endowed scholarship award (MSU)

2005 Student leadership recognition award for outstanding leadership (WCSU)

2005 Sigma Xi research award in Physics, Astronomy & Meteorology (WCSU)

2004 Wohlever award in Computer Science (WCSU)

Fields of Research Interest

Numerical analysis, scientific computing, application of numerical methods in physics and chemistry

Research

Publications and preprints

Dhagash Mehta, Tianran Chen, Jonathan Hauenstein, David Wales (2014) Newton homotopies for sampling stationary points of potential energy landscapes. *The Journal of Chemical Physics 141 (12), 121104* `http://dx.doi.org/10.1063/1.4896657.`

Tianran Chen, Tien-Yien Li (2014). Solutions to systems of binomial equations. *Annales Mathematicae Silesianae 28:7–34*.

Tianran Chen, Tsung-Lin Lee, Tien-Yien Li (2014). Hom4PS-3: A Parallel Numerical Solver for Systems of Polynomial Equations Based on Polyhedral Homotopy Continuation Methods *Mathematical Software – ICMS 2014 – 4th International Congress, Seoul, South Korea, August 5-9, 2014. Proceedings 8592:183–190* `http://dx.doi.org/10.1007/978-3-662-44199-2_30`

Tianran Chen, Tsung-Lin Lee, Tien-Yien Li (2014). Mixed cells computation in parallel. *Taiwanese Journal of Mathematics 18(1):93–114*.

Tianran Chen, Tien-Yien Li (2012). Spherical projective path tracking for homotopy continuation methods. *Communications in Information and Systems 12(3):195-220*.

Tianran Chen, Tien-Yien Li, Xiaoshen Wang (2014) Theoretical aspects of mixed volume computation via mixed subdivision. *(Submitted to) Communications in Information and Systems*.

Tianran Chen, Tien-Yien Li (2014) Homotopy continuation method for solving systems of nonlinear and polynomial equations. *(In preparation)*

Tianran Chen, Dhagash Mehta (2014) Computing the degree of solution sets of systems of binomial equations with an application to the Master Space problem. *(In preparation)*

Scientific Software

Core developer of Hom4PS-3: A parallel numerical solver for systems of polynomial equations based on the Polyhedral Homotopy Method.

Core developer of MixedVol-3: A parallel software package for computing volume of polytopes, mixed volume, BKK bound, and fine mixed cells.

Sole developer of BinomialSolver: A parallel numerical solver for binomial systems.

All software are freely available at `www.hom4ps3.org`.

Invited Presentations

Conferences

The 4th International Congress on Mathematical Software 2014, Seoul, South Korea, August 9, 2014.

> *Hom4PS-3: A parallel numerical solver for polynomial systems based on polyhedral homotopy method*

AMS Joint Mathematics Meetings, Baltimore, MD USA, January 16, 2014.

> *Toric Path Tracking for Homotopy Continuation Methods*

2013 SIAM Conference on Applied Algebraic Geometry, Fort Collins, CO USA, Aug 6, 2013.

> *Projective Path Tracking for Homotopy Continuation Methods*

2013 Summer School On Numerical Algebraic Geometry, Laboratory for Automated Reasoning and Programming, Chengdu Institute of Computer Applications, Chengdu, China, Jun 7, 2013.

An Introduction to Hom4PS-3

2011 SIAM Conference on Applied Algebraic Geometry, Raleigh, NC USA, Oct 7, 2011.

Hom4PS in Parallel

Midwest Numerical Analysis Day, West Lafayette, IN USA, May 8, 2011.

Mixed Cells Computation In Parallel

1064th AMS Meeting, Notre Dame, IN USA, Nov 6, 2010.

Mixed Volume Computation In Parallel

Invited seminar lecture

Numerical Algebraic Geometry Lab, Colorado State University, Apr 18, 2011.

Teaching Experience

Michigan State University:

2012 – 2014   Instructor:

Responsibilities: lecturing, designing exams, and supervising TAs.

Courses: *Calculus II, Linear Algebra, Transition to Advanced Mathematics*.

2007 – 2011   Teaching assistant:

Responsibilities: lecturing (as the main instructor), designing exams, and grading.

Courses: *College Algebra, Finite Mathematics and Elements of College Algebra, Survey of Calculus with Applications I & II (for business majors), Calculus I*.

2006 – 2007   Teaching assistant:

Responsibilities: grading and teaching recitation sessions.

Courses: *Calculus I & II*.

Professional Service

AMS Special Session: Co-organizer for the *Special Session on Homotopy Continuation Methods and Their Applications to Science and Engineering* at the American Mathematical Society 2015 Central Spring Sectional Meeting, East Lansing, MI, March 14-15, 2015