

RYO TAKEI

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RESEARCH INTERESTS

Specific: optimal control, differential games, Hamilton-Jacobi equations, interface motion

General: numerical analysis, PDEs, modeling of engineering problems, applied mathematics

EDUCATION

Ph.D. in Mathematics (expected June 2011) University of California, Los Angeles (UCLA), USA

B.Sc., M.Sc. in Mathematics (2005, 2007) Simon Fraser University (SFU), Canada

Advisors: S. Osher (Ph.D.), A. Oberman (M.Sc.)

Ph.D. Dissertation: *Numerical methods for problems in optimal control and differential games*

PUBLICATIONS

Articles, conference proceeding & thesis:

1. (with A. Oberman, S. Osher, R. Tsai) Numerical methods for anisotropic mean curvature flow based on a discrete time variational formulation, *to appear in Comm. in Math. Sci.*
2. (with R. Tsai) A class of Hamilton-Jacobi equations for computing curvature constrained motion, *UCLA CAM reports 10-67, 2010.*
3. (with R. Tsai, H. Shen, Y. Landa) A practical path-planning algorithm for a vehicle with a constrained turning radius: a Hamilton-Jacobi approach, *Proc. to the American Control Conference 2010, Baltimore, MD.*
4. (with R. Tsai, H. Shen, Y. Landa) Autonomous source discovery and navigation in complicated environments, *UCLA CAM reports 09-73, 2009.*
5. (with A. Oberman, A. Vladimirov) Homogenization of metric Hamilton-Jacobi Equations, *Multiscale Modeling and Simulation, Vol. 8 Number 1 (2009) 269-295.*
6. Modern numerical methods for motion by mean curvature., *M.Sc. thesis, Simon Fraser University, 2007.*

Articles in preparation:

1. (with Y. Landa, R. Tsai) Level set visibility based pursuit evasion in a domain with complicated geometry.
2. (with W. Chen, Z. Clawson, S. Kirov, A. Vladimirov) Optimal path planning under budget constraints.

AWARDS & SCHOLARSHIPS

2007 NSERC Postgraduate Scholarship (Doctoral) for abroad (UCLA)

2007 NSERC Canadian Graduate Scholarship (Doctoral), declined

2005 SFU C. D. Nelson Memorial Graduate Scholarship

2005 NSERC Canadian Graduate Scholarship (Masters)

2005 SFU Nominated for Dean's Convocation Medal (Faculty of Science)

2005 NSERC Undergraduate Student Research Award

2001 SFU Gordon M. Shrum Entrance Scholarship

(NSERC = National Science and Engineering Research Council of Canada)

RESEARCH EXPERIENCE

- May 2010 – **Graduate Research Assistantship (UCLA)**
present Worked on various projects including anisotropic mean curvature flow, numerical homogenization, optimal path planning and differential games. Jointly mentored by Professors S. Osher (UCLA), R. Tsai (U Texas, Austin), A. Oberman (SFU), A. Vladimirovsky (Cornell), C.-Y. Kao (Ohio State).
- Jan 2007 – **Master’s Thesis (SFU)**
Jun. 2007 Studied the level set formulation of motion by mean curvature from the viewpoint of viscosity solutions, differential games, and numerical methods. Supervisor: Adam Oberman.
- May 2005 – **NSERC Summer Undergraduate Research Student (SFU)**
Aug. 2005 Researched on PDE based image denoising. Supervisor: Adam Oberman.

WORK EXPERIENCE

- Jan. 2008 – **Teaching Assistance/Associate at UCLA**
Apr. 2010 Differential equations (Math 33B, 135), numerical analysis (Math 151A/B).
- Jan. 2006 – **Teaching Assistance/Marking Position at SFU**
Aug. 2006 Complex analysis & vector calculus (Math 251), first year calculus.

CONFERENCES & WORKSHOPS ATTENDED

- 01/11 - (expected) AMS Joint Mathematics Meeting (New Orleans, USA)
07/10 - 2010 American Control Conference (Baltimore, USA)
07/09 - PIMS “New connections between differential and random turn games and elliptic and parabolic differential equations” (Vancouver, Canada)
07/09 - PIMS “Analysis of nonlinear PDEs and free boundary problems; applications to homogenization” (Vancouver, Canada)
08/08 - BIRS “Recent developments in numerical methods for nonlinear hyperbolic PDEs and their applications” (Banff, Canada)
12/06 - BIRS “Numerical methods for degenerate elliptic equations and applications” (Banff, Canada)
09/06 - Pacific Northwest Numerical Analysis Seminar (Vancouver, Canada)
07/05 - BIRS “New directions in PDEs” (Banff, Canada)

REFERENCES

- Stanley J. Osher (Ph.D. advisor), UCLA. sjo@math.ucla.edu
Adam M. Oberman (M.Sc. advisor), Simon Fraser University. aoberman@math.sfu.ca
Richard Y.-H. Tsai, Univ. of Texas, Austin. ytsai@math.utexas.edu
Alexander B. Vladimirovsky, Cornell University. vlad@math.cornell.edu
Magda Albert (teaching reference), UCLA. malbert@math.ucla.edu

PERSONAL INFORMATION

Canadian and Japanese (dual) citizenships