

Curriculum Vitae - Nahid Banihashemi

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RESEARCH AREA Optimal Control, Optimization

EDUCATION

Ph.D in Applied Mathematics at the University of South Australia, from March 2009 to September 2012.

- Thesis Topic: Inexact Restoration and Adaptive Mesh Refinement for Optimal Control.
- Supervisors: Dr. Yalcin Kaya and A/P. Regina Burachik

Master Degree in Applied Mathematics from the Shahid Chamran University, Ahvaz, Iran, June 2006 (<http://www.scu.ac.ir/>)

- Thesis Topic: Extended Conjugate Gradient Method to Solve Optimal control Problems
- Supervisor: Dr. Mehdi Dehghan

Bachelor degree in Applied Mathematics from the Amirkabir University of Technology, Tehran, Iran, June 2003
<http://www.aut.ac.ir/>

WORK

EXPERIENCE

June 2009 - Present: Associate Lecturer in Mathematics, University of South Australia.

March 2006 - January 2009: Lecturer in Mathematics, Azad University of Gachsaran, Iran.

PUBLICATION

Banihashemi, N. and Kaya, C.Yalcin. Inexact Restoration to Solve Box-Constrained Optimal Control Problems, Journal of Optimization Theory and Applications, doi:10.1007/s10957-012-0140-4, 2012.

Banihashemi, N. and Kaya, C.Yalcin. Inexact Restoration and Adaptive Mesh Refinement for optimal control, Journal of Industrial and Management Optimization, Submitted for publication, , 2012.

Fahimnia, B., Sarkis, J. , Rahman, Sh. and Banihashemi, N. The Impact of Carbon Pricing on a Closed-Loop Supply Chain: An Australian Case Study, Journal of Cleaner Production, submitted for publication, 2012.

Banihashemi, N. and Fakharzadeh Jahromi, A., Comparing Conjugate Gradient method and Embedding method to solve optimal control problem with application in chemical engineering. Tarbiate Moallem University Journal of Science, 2012.

INVITED TALKS

I was invited to give a talk titled "Inexact Restoration method to solve constrained optimal control problems" to the school of mathematics in the Shiraz University of Technology, Iran , July 2011.

I was invited to give a talk titled "Inexact Restoration and Optimal control for HIV" to the School of Medicine in the University of New South Wale on 22 of June 2012.

CONFERENCE
PRESENTATIONS

Banihashemi, N. and Kaya, C.Yalcin. Inexact Restoration method and optimal control for HIV. SA ANZIAM, Mini-conference, 16-17 June , 2012, McLaren Vale Motel and Apartments, SA, Australia.

Banihashemi, N. and Kaya, C.Yalcin. Inexact Restoration and Adaptive mesh Refinement in optimal control, ANZIAM2012, 26 Jan-2 Feb , 2012, the Lady Bay Resort and Sebel Deep Blue, Warrnambool, Western Victoria, Australia.

Banihashemi. N and Kaya, C.Yalcin. Constrained optimal control problems and Inexact Restoration method. Optimization2011, Universidade Nova de Lisboa, 24-27 July 2011. Portugal , Lisbon.

Banihashemi. N and Kaya, C.Yalcin. Inexact Restoration method to solve constrained optimal control problems. ANZIAM2011, Stamford Grand Hotel, Glenelg, South Australia, 30 January to Thursday 3 February 2011. <http://anziam2011.adelaide.edu.au/>

Banihashemi. N and Kaya, C.Yalcin. Inexact Restoration method and adaptive mesh refinement approach. AustMs2010, The University of Queensland, Brisbane, Australia, 27th - 30th September 2010 . <http://www.smp.uq.edu.au/austms2010/>

Banihashemi. N and Fakharzadeh, A., Comparing Conjugate Gradient method and Embedding method to solve optimal control problem with application in chemical engineering. CHAOS2008 conference, June 3 - 6 Chania Crete Greece, 2008. <http://www.chaos2008.net/>

Banihashemi. N and Dehghan, M, Extended Conjugate Gradient method to solve optimal control problem, 35th Annual Mathematics and Statistics Conference, Ahvaz, Iran, January 26-29, 2005.

CONFERENCES
AND WORKSHOPS
ATTENDED

SA Postgraduate Mathematics Symposium,10th April 2012, Flinders University, South Australia, Australia.

ANZIAM2012, 26 Jan-2 Feb 2012, the Lady Bay Resort and Sebel Deep Blue, Warrnambool, Western Victoria, Australia.

The Optimization2011 conference , Universidade Nova de Lisboa, 24-27 July 2011. Portugal , Lisbon.

Session Celebrating the 60th Anniversary of Joaquim Joo Jdice, 23 July 2011, Hotel Mlia Capuchos, Portugal, Lisbon.

AMSI-CIAM Optimisation and Control Day 2011, City West Campus, University of South Australia,29 January 2011, Adelaide , south Australia.

The 2011 annual Australian and New Zealand Industrial and Applied Mathematics Conference, ANZIAM2011, Stamford Grand Hotel, Glenelg, South Australia, 30 January to Thursday 3 February 2011. <http://anziam2011.adelaide.edu.au/>

Numerical Methods for Continuous Optimization Workshop, The University of California, Los Angeles UCLA, IPAM Building, October 11 - 15, 2010.
<https://www.ipam.ucla.edu/schedule.aspx?pc=opws2>

54rd Annual Meeting of the Australian Mathematical Society conference, AustMs2010, The University of Queensland, Brisbane, Australia, 27th 30th September 2010.

The 9th Engineering Mathematics and Applications Conference, EMAC2009, the University of Adelaide , 6th - 9th December 2009, Adelaide, South Australia.

Workshop on Perturbations, Game Theory, Stochastic, Optimization and Applications, 26-27 September, University of South Australia, City West Campus (North Terrace), Adelaide, South Australia, 2009

53rd Annual Meeting of the Australian Mathematical Society Conference, 28th September to 1st October, University of South Australia, City West Campus (North Terrace), Adelaide, South Australia, 2009

35th Annual Iranian Mathematics and Statistics Conference, Ahvaz, Iran, January 26-29, 2005.

34th Annual Iranian Mathematics and Statistics Conference, Shahroud University., Shahroud, Iran, August 26-29, 2003

SCHOLARSHIPS AND AWARDS

- University President's Scholarship (UPS) from the University of South Australia to start Ph.D in Applied Mathematics in Australia in 16 March 2009.
- Financial support from the University of California, Los Angeles UCLA to attend the Numerical Methods for Continuous Optimization Workshop (2010) in UCLA, USA.
- Financial support from the CSIRO-ANZIAM Student Support Scheme to attend the ANZIAM2011 and ANZIAM2012 in Australia.

- The certificate of "the most valuable member" of the Unilife for creating the Adelaide Postgraduate Club.

TEACHING EXPERIENCE

Calculus I, Ordinary Differential Equation, Operating Research, Mathematical Methods for Engineers 1, Mathematical Methods for Engineers 2, Engineering Modeling, Discrete Mathematics and Matlab Guide for engineering students.

LEADERSHIP

- President of the Adelaide Postgraduate Club since July 2011: I started this club in order to increase the social interaction of the postgraduate students that study in the Adelaide region. This club is affiliated to the Unilife organization and at the moment, has over 300 members. I received the certificate of "the most valuable member" of the Unilife because of organizing and leading this club.
- Organizer of the Postgraduate Seminar in the School of Mathematics and Statistics , University of South Australia from September 2010 to January 2012.
- Co-organizer for the SA Postgraduate Mathematics Symposium which was held in the Flinders University, South Australia, Australia on 10th April 2012.

TECHNICAL SKILLS

MATLAB experience: Linear Algebra, Differential Equations, Nonlinear Numerical Methods, Polynomials, Optimization and Programming.

MAPLE experience: Linear Algebra, Differential Equations, Nonlinear Numerical Methods, Polynomials, Optimization and Programming.

Programming:

I am competent to program in the C, C++, Pascal, Ampl environment . Also I have used the optimization solvers such as Ipopt, Minos, Algencan and Cplex interfacing Ampl to solve Optimization problems.

Applications:

\TeX , \LaTeX , \BIBTeX , Microsoft Office, and other common productivity packages for Windows.

Operating Systems:

Microsoft Windows XP.

REFEREES

Dr. Kaya C. Yalcin, Senior Lecturer, Division of Information Technology, Engineering and the Environment, School of Mathematics and Statistics , Mawson Lakes Campus, University of South Australia .

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Associate Professor Regina Burachik, Division of Information Technology, Engineering and the Environment, School of Mathematics and Statistics , Mawson Lakes Campus, University of South Australia .

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Email: Regina.Burachik@unisa.edu.au

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Prof. Jim Hill, Professor of Applied Mathematics and Head of Nanomechanics Group, Room 736, School of Mathematical Sciences, University of Adelaide SA 5005.

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STATEMENT

I submitted my Ph.D thesis in Applied Mathematics in September this year to the Graduate Research Center of the University of South Australia. The title of my thesis is " Inexact Restoration and Adaptive Mesh Refinement for optimal control problems". Optimal control has many applications in science and engineering. The Inexact Restoration method is an iterative method for solving optimization problems. The local version of this method starts from an initial guess and through two distinctive phases generates a sequence of points which will converge to the optimal solution of the problem. It has been shown through numerical experiments that this method is more robust than the traditional Newton method, Projected Newton method.

As part of my Ph.D, I have implemented the IR algorithm, and used Adaptive Mesh Refinement to develop a faster, more robust version of the IR algorithm. The algorithms are coded in AMPL, which is a modelling and solving language for optimization problems. AMPL is used because it is a well known and provides a user friendly environment for optimization problems and allows the users to interface optimization solvers such as Ipopt to solve the subproblems as part of the IR method. My work requires both comprehensive analytical and numerical analysis. I have spent much time developing computer programs to implement the IR algorithm, and applying it to test problems including the control of a container crane, free-flying robots, space vehicles, submerged rigid bodies and anti-angiogenesis for tumor cells.

Implementing the IR algorithms in AMPL was a complicated task, and I had to develop good programming skills. As well as coding in AMPL, I have supervised engineering students in their MATLAB projects for different courses including Engineering Modeling and Mathematical Methods for Engineering. I am proficient with MATLAB, AMPL and other software packages related to mathematics.

I was a Lecturer for 3 years in two Iranian universities from 2006 to 2009. During this time, I taught mathematics to Engineering and Mathematics students. I have been Associate Lecturer since 2009 in the University of South Australia. I believe that I have considerable experience in terms of teaching mathematics and dealing with students, and I am fully cognizant of the challenges.