Professor Hai-wei Sun

Curriculum Vitae 2013

Personal Particulars:
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Academic Background:

8/1993–8/1996	Ph.D., Applied Mathematics, Chinese University of Hong Kong, Hong Kong. Title of Dissertation: *Fast Algorithms for Ill-Conditioned Toeplitz and Toeplitz-Like Systems.*
9/1986–7/1989	M.Sc., Applied Mathematics, Sun Yet-Sen (Zhongshan) University, Guangzhou, China. Title of Dissertation: *Some New Results on Approximate Controllability for Semilinear Systems*
9/1979–7/1983	B.Sc., Mathematics, Sun Yet-Sen (Zhongshan) University, Guangzhou, China.

Working Experiences:

9/2011–now	Associate Professor, Department of Mathematics, Faculty of Science and Technology, University of Macau, Macao.
9/2004–8/2011	Assistant Professor, Department of Mathematics, Faculty of Science and Technology, University of Macau, Macao.
8/2002–7/2004	Postdoctoral Fellow, Department of Chemical Engineering, University of Alabama, Tuscaloosa, Alabama, USA
2/2001–7/2002	Postdoctoral Fellow, Laboratory for High Performance Scientific Computing and Computer Simulation & Department of Computer Science, University of Kentucky, Lexington, Kentucky, USA
12/1998–1/2001	Associate Professor, Department of Applied Mathematics, Guangdong University of Technology, Guangzhou, China.
8/1996–11/1998	Assistant Professor, Department of Applied Mathematics, Guangdong University of Technology, Guangzhou, China.
7/1989–7/1993	Lecturer, Department of Basic Courses, Guangdong University of Technology, Guangzhou, China.
7/1983–9/1986	TA, Department of Basic Courses, Guangdong University of Technology, Guangzhou, China.

Master Students Supervised:

Name	Institution	Start Year	Completion Year
(7) Chunyang Zhang	University of Macau	9/2010	8/2012
(6) Spike Tsz-ho Lee	University of Macau	9/2007	8/2010
(5) Xin Liu	University of Macau	9/2008	7/2010
(4) Kun-leng Lao	University of Macau	9/2006	6/2010
(3) Venus Weng-cheng Chiang	University of Macau	9/2004	8/2008
(2) Shun Zhang	University of Macau	9/2004	4/2007
(1) Chi-keong Leong	University of Macau	9/2004	7/2006

PhD Students Co-Supervised:

Name	Institution	Start Year	Completion Year
(3) Qing-jiang Meng	University of Macau	9/2010	8/2013
(2) Hong-kui Pang	University of Macau	9/2008	8/2011
(1) Ying-ying Zhang	University of Macau	9/2007	8/2010

External Grants:

(7) *Fast Algorithm for Identifying Essential Nodes for Complex Networks with Applications to Protein Functions Predictions*, **H. Sun (Co-PI)**, Grant from NSF of China, Amount: RMB560,000, Period: January 2014 – December 2017.

(6) *Numerical Solution Methods for a Type of Robin Inverse Problems*, **H. Sun (Co-PI)**, Grant from NSF of China, Amount: RMB500,000, Period: January 2013 – December 2016.

(5) *Numerical Solutions for Partial Differential Equations with Fractional Order Derivatives*, by **H. Sun (PI)**, Grant from FDCT of Macao, Amount: MOP1,303,300, Period: November 2013 – November 2016.

(4) *Krylov Subspace Methods for Exponential Time Integrations with Toeplitz Structure*, by **H. Sun (PI)**, Grant from FDCT of Macao, Amount: MOP720,200, Period: November 2012 – November 2014.

(3) *High Order Schemes for Option Pricing in Jump-Diffusion Models*, by **H. Sun (PI)**, Grant from FDCT of Macao, Amount: MOP349,000, Period: November 2009 – November 2011.

(2) *Financial Computing and Saddle Point Problem*, by X. Jin (PI), D. Ding, **H. Sun (Co-PI)**, and V. Sin, Grant from FDCT of Macao, Amount: MOP500,000, Period: January 2006 – December 2007.

(1) *Fast Algorithm for the Ill-Conditioned Toeplitz Systems*, by **H. Sun (PI)**, Grant from NSF of China, Amount: RMB70,000, Period: January 2000 – December 2002.

Internal Grants:

(9) *Fast Numerical Solutions to the Fractional Partial Differential Equations*, by **H. Sun (PI)**, Grant from University of Macau, Amount: MOP1,342,000, Period: May 2013 – May 2016.

(8) *Fast Approximations to the Toeplitz Matrix Functions*, by **H. Sun (PI)**, Grant from University of Macau, Amount: MOP1,458,000, Period: January 2012 – December 2014.

(7) *High-Order Compact Schemes with Alternating Direction Implicit Methods for Solving Parabolic Equations*, by **H. Sun (PI)**, Grant from University of Macau, Amount: MOP532,000, Period: June 2011 – May 2013.

(6) *Fast Approximation to the Toeplitz Matrix Exponential with Applications*, by **H. Sun (PI)**, Grant from University of Macau, Amount: MOP182,400, Period: January 2010 – December 2010.

(5) *High Order Schemes for Option Pricing in Jump-Diffusion Models*, by **H. Sun (PI)**, Grant from University of Macau, Amount: MOP134,000, Period: January 2009 – December 2009.

(4) *Preconditioning Techniques for Large Linear Systems and Their Applications*, by X. Jin (PI), D. Ding, **H. Sun (Co-PI)**, and V. Sin, U-Level Grant from University of Macau, Amount: MOP1,900,000, Period: January 2008 – December 2012.

(3) *Numerical Solutions of Reflected Stochastic Differential Equations and Their Applications to Numerical PDEs*, by D. Ding (PI) and **H. Sun (Co-PI)**, Grant from University of Macau, Amount: MOP46,000, Period: January 2007 – December 2007.

(2) *High Order Accuracy of the HNG Finite Difference Compact Scheme for Solving PDEs and SDEs*, by **H. Sun (PI)** and D. Ding (Co-PI), Grant from University of Macau, Amount: MOP45,000, Period: January 2006 – December 2006.

(1) *Multigrid Methods for Solving Problems from Markovian Queueing Networks*, by **H. Sun (PI)** and D. Ding (Co-PI), Grant from University of Macau, Amount: MOP55,000, Period: January 2005 – December 2005.

Publications: (" * " means a graduate student)

Refereed Edited Books

(2) X. Jin, **H. Sun**, and S. Vong (editors), *Recent Advances in Scientific Computing and Matrix Analysis*, International Press of Boston, Somerville, 2011.

(1) X. Jin, D. Ding and **H. Sun** (editors), *Recent Advances in Computational Mathematics*, Higher Education Press, Beijing & International Press of Boston, Somerville, 2008.

Refereed Proceedings Papers and Book Chapters [**cited by**]

(7) J. Liu* and **H. Sun**, *Sinc-Galerkin Method for the Option Pricing Under Jump-Diffusion Model, East-West J. of Mathematics*, a special volume for the ICMA-MU 2009 Conference, Bangkok, Thailand, pp. 317–327.

(6) **H. Sun** and S. Lee*, *A High Order Compact Scheme for Option Pricing with Jumps*, Proceedings of the 4th East Asia SIAM Conference, Daejeon, Korea, **MINS**, October 2008, pp. 119–125.

(5) **H. Sun** and W. Wang*, *A Fourth-Order Compact BVM Scheme for the Two-Dimensional Heat Equations*, Proceedings of the 2008 International Conference on Scientific Computing, Las Vegas Nevada, USA, **CSREA Press**, July 2008, pp. 310–314. [**EI**]

(4) J. Hou* and **H. Sun**, *A Preconditioner from Crank-Nicolson Scheme for Systems of LMF Based ODE Code*, Recent Advances in Computational Mathematics, **Higher Education Press, Beijing & International Press of Boston, Somerville**, 2008, pp. 139–149.

(3) R. Chan, T. Tso, and **H. Sun**, *Circulant Preconditioners from B-Splines*, Proceedings to the SPIE Symposium on Advanced Signal Processing: Algorithms, Architectures, and Implementations, Vol. 3162, San Diego CA, July, 1997, Ed:F. Luk. [**EI**]

(2) R. Chan, C. Cheung, and **H. Sun**, *Fast Algorithms for Problems on Thermal Tomography*, Proceedings of the First Workshop on Numerical Analysis and Applications, Bulgaria, **Springer-Verlag,** June, 1996.

(1) **H. Sun** and Y. Zhao, *Some New Results on Approximate Controllability*, Proceedings of the IFIP WG 7.2 Working Conference, Shanghai China, May 6-9, 1990, pp154–161, Eds:X. Li and J. Yong, **Springer-Verlag**, 1991. [**SCI, EI**]

Refereed Journal Papers

(24) S. Lei and **H. Sun**, *A circulant preconditioner for fractional diffusion equations*, **Journal of Computational Physics**, Vol. 242 (4), pp. 715–725, 2013. *Corresponding Author* [**SCI, EI**]

(23) R. Chan, S. Lee*, and **H. Sun**, *Boundary Value Methods for Transient Solutions of Queueing Networks with Variant Vacation Policy*, **Journal of Computational and Applied Mathematics**, Vol. 236 (16), pp. 3948–3955, 2012. *Corresponding Author* [**SCI, EI**]

(22) Q. Sheng and **H. Sun**, *Asymptotic Stability of an Eikonal Transformation Based ADI Method for the Paraxial Helmholtz Equation at High Wave Numbers*, **Communications in Computational Physics**, Vol. 12 (4), pp. 1275–1292, 2012. [**SCI, EI**]

(21) S. Lee* and **H. Sun**, *Fourth Order Compact Scheme with Local Mesh Refinement for Option Pricing in Jump-Diffusion Model*, **Numerical Methods for Partial Differential Equations**, Vol. 28 (2), pp. 1079–1098, 2012. *Corresponding Author* [**SCI, EI**]

(20) S. Lee*, X. Liu*, and **H. Sun**, *Fast Exponential Time Integration Scheme for Option Pricing with Jumps*, **Numerical Linear Algebra with Applications**, Vol. 19 (1), pp. 87–101, 2012. *Corresponding Author* [**SCI, EI**]

(19) H. Pang* and **H. Sun**, *Multigrid method for fractional diffusion equations* , **Journal of Computational Physics**, Vol. 231(2), pp. 693–703, 2012. *Corresponding Author* [**SCI, EI**]

(18) S. Yang, S. Lee*, and **H. Sun**, *Boundary Value Methods with Crank-Nicolson Preconditioner for Option Pricing Model*, **International Journal of Computer Mathematics.** Vol. 88 (8), pp. 1730-1748, 2011. *Corresponding Author* [**SCI, EI**]

(17) H. Pang* and **H. Sun**, *Shift-Invert Lanczos Method for the Symmetric Positive Semidefinite Toeplitz Matrix Exponential*, **Numerical Linear Algebra with Applications**, Vol. 18 (3), pp. 603–614, 2011. *Corresponding Author* [**SCI, EI**]

(16) S. Yang, J. Cai, and **H. Sun**, *Multigrid Algorithm from Cyclic Reduction for Markovian Queueing Networks*, Vol. 217 (16), pp. 6990–7000, 2011. *Corresponding Author* [**SCI, EI**]

(15) S. Lee*, H. Pang*, and **H. Sun**, *Shift-Invert Arnoldi Approximation to the Toeplitz Matrix Exponential*, **SIAM Journal on Scientific Computing**, Vol. 32, No. 2, pp.774–792, 2010. *Corresponding Author.* [**SCI, EI**]

(14) S. Lee* and **H. Sun**, *Fourth Order Compact Boundary Value Method for Option Pricing with Jumps*, **Advance in Applied Mathematics and Mechanics**, Vol. 1, No. 6, pp.845–861, 2009. *Corresponding Author.* [**SCI**]

(13) N. Xu, Y. Zhang, **H. Sun**, and Y. Xiong, *Structural Features of Attribute Reduction Matrix and Layer Fast Algorithm*, **Control Theory & Applications**, Vol. 24, No. 5. pp.766–770, 2007. [**EI**]

(12) **H. Sun** and J. Zhang, *A High Order Finite Difference Discretization Strategy Based on Extrapolation for Convection Diffusion Equations*, **Numerical Methods for Partial Differential Equations**, Vol. 20, No. 1, pp.18–32, 2004. [**SCI, EI**]

(11) **H. Sun**, N. Kang, J. Zhang, and E. Carlson, *A Fourth Order Compact Difference Scheme on Face Centered Cubic Grids with Multigrid Method for Solving 2D Convection Diffusion*, **Mathematics and Computers in Simulations**, Vol. 63, No. 6, pp.651–661, 2003. [**SCI, EI**]

(10) **H. Sun** and J. Zhang, *A High Order Compact Boundary Value Method for Solving One Dimensional Heat Equations*, **Numerical Methods for Partial Differential Equations**, Vol. 19, No. 6, pp.846–857, 2003. [**SCI, EI**]

(9) M. Ng, **H. Sun**, and X. Jin, *Recursive-Based PCG Methods for Toeplitz Systems with Nonnegative Generating Functions*, **SIAM Journal on Scientific Computing**, Vol. 24, No. 5, pp.1507–1529, 2003. [**SCI, EI**]

(8) J. Zhang, **H. Sun**, and J. Zhao, *High Order Compact Scheme with Multigrid Local Refinement Procedure for Convection Diffusion Problems*, **Computer Methods in Applied Mechanics and Engineering**, Vol. 191, No. 41-42, pp.4661–4674, 2002. [**SCI, EI**]

(7) **H. Sun**, X. Jin, and Q. Chang, *The Convergence of Multigrid Method for Block Toeplitz Systems with Nonnegative Generating Function*, **BIT**, Vol. 41, No. 1, pp.179–190, 2001. [**SCI**]

(6) R. Chan, W. Ng, and **H. Sun**, *Fast Construction of Optimal Circulant Preconditioners for Matrices from fast Dense Matrix Method*, **BIT**, Vol. 40, No. 1, pp.24–40, 2000. [**SCI**]

(5) R. Chan, **H. Sun**, and W. Ng, *Circulant Preconditioners for Ill-Conditioned Boundary Integral Equations from Potential Equations*, **International Journal for Numerical Methods in Engineering**, Vol. 43, No. 8, pp.1505–1521, 1998. [**SCI, EI**]

(4) R. Chan, Q. Chang, and **H. Sun**, *Multigrid Method for Ill-Conditioned Symmetric Toeplitz Systems*, **SIAM Journal on Scientific Computing**, Vol. 19, No. 2, pp.516–529, 1998. [**SCI, EI**]

(3) **H. Sun**, *Fast Algorithms for Ill-conditioned Toeplitz and Toeplitz-Like Systems*, **Bulletins of Hong Kong Mathematics Society**, Vol. 1, pp187–190, 1997.

(2) **H. Sun**, R. Chan, and Q. Chang, *A Note on the Convergence of the Two-Grid Method for Toeplitz Systems*, **Computers & Mathematics with Applications**, Vol. 34, No. 1, pp.11–18, 1997. [**SCI, EI**]

(1) Z. Zhang and **H. Sun**, *New Approximate Methods for Time-Variant Systems and Its Applications*, **Control Theory & Applications**, Vol. 13, Suppl. 1, pp.766–770, 1996.

Reviewer for Journals:

- Advances in Numerical Analysis.

- Applied Mathematics and Computation.

- BIT.

- Computers and Mathematics with Applications.

- Computing.

- Electronic Transaction on Numerical Analysis.

- IEEE Signal Processing Letters.

- Journal of Computational and Applied Mathematics.

- Linear Algebra and Its Applications.

- Numerical Linear Algebra and Applications.

- Numerical Mathematics.

- Numerische Mathematik.

- SIAM Journal on Matrix Analysis and Applications.

- SIAM Journal on Numerical Analysis.

- SIAM Journal on Scientific Computing.

- Southeast Asian Bulletin of Mathematics.

Conference Talks:

Invited Conference Talks:

(6) 30-min Talk, *The Third Workshop on Numerical Linear Algebra and High Performance Computing*, The Chinese University of Hong Kong, Hong Kong, March 26–27, 2011.

(5) 30-min Talk, *Workshop on Numerical Algebra and High Performance Computation*, South China Normal University, Guangzhou, China, March 26–29, 2010.

(4) 30-min Talk, *The Third International Conference on Structured Matrices and Tensors*, Hong Kong, January 19–22, 2010.

(3) 30-min Talk, *The 2nd MMC and the 5th EASIAM Conference*, Brunei, June 8–11, 2009. (**Session Chair**)

(2) 40-min Talk, *The 4th EASIAM Conference*, Daejon, Korea, October 10–12, 2008.

(1) 30-min Talk, *The 2nd International Conference on Structured Matrices*, Hong Kong, June 8–11, 2006.

Contributed Conference Talks:

(7) *The 2010 SIAM Annual Meeting*, Pittsburgh, USA, July 12–16, 2010. (**Session Chair**)

(6) *The International Conference in Mathematics and Applications*, Bangkok, Thailand, December 17–19, 2009.

(5) *The Third International Conference on Scientific Computing and Partial Differential Equations*, Hong Kong Baptist University, Hong Kong, December 8–12, 2008.

(4) *CSC'08/WORLDCOMP'08 conference*, Las Vegas, USA, July 14–17, 2008.

(3) *Widwest Numerical Analysis Day*, University of Illinois, Urbana, IL, USA, May 12, 2001.

(2) *International Symposium on Methods and Applications of Analysis*, Hong Kong, December 16–19, 1994.

(1) *IFIP WG 7.2 Working Conference*, Shanghai, China, May 6–9, 1990.

Visiting Scholar/Invited Speaker:

(13) Beijing Normal University at Zhuhai, Zhuhai, China, December 30, 2010.

(12) South China Normal University, Guangzhou, China, November 28–29, 2010.

(11) Jinan University, Guangzhou, China, November 13–15, 2010.

(10) Beijing Normal University at Zhuhai, Zhuhai, China, November 30, 2009.

(9) Xuzhou Normal University, Xuzhou, China, July 3–6, 2009.

(8) Fudan University, Shanghai, China, June 29–July 3, 2009.

(7) South China Normal University, Guangzhou, China, December 12, 2008.

(6) Lawrance Berkeley National Laboratory, Berkeley, CA, USA, September 4–7, 2002.

(5) Southern Illinois University, Carbondale, IL, USA, April 10, 2001.

(4) Hong Kong University, Hong Kong, June 17–August 17, 2000.

(3) Chinese University of Hong Kong, Hong Kong, August 3–7,1999.

(2) Hong Kong Unviersity, Hong Kong, March 15–August 15, 1998.

(1) Chinese University of Hong Kong, Hong Kong, December 1–31, 1996.

Professional Societies:

(4) Associate Editor of *International Journal of Computer Mathematics* (**SCI**) (since 2012).

(3) Invited Reviewer for *Mathematical Review* (American Mathematical Society). (since July, 2010)

(2) Associate Editor of *East Asia Journal of Applied Mathematics* (since 2010).

(1) Member of *Executive Committee of SIAM - East Asia Section.* (since 2006).