Abdul Hanan Sheikh

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Education

Ph.D. Numerical Analysis, Delft University of Technology, *expected* 18 November 2014.

M.Phill. Mathematics (One year course work), Quaid-i-Azam University Islamabad, Pakistan, 2008

M.Sc. Mathematics, Quaid-i-Azam University Islamabad, Pakistan, 2007.

B.Sc. with Mathematics, Physics and Computer Science, SALU Khairpur Sindh Pakistan, 2004.

Research

Established Skills

Numerical Linear Algebra, Scientific computing, Krylov methods, Multigrid methods, Deflation type preconditioners, Helmholtz solvers.

Interests

Mathematical Modeling, Higher order discretization techniques, FEM.

Academic Experience

NED University of Engineering and Technology, Karachi Pakistan

Lecturer, Department of Mathematics & basic sciences, Jan 2008–Mar 2009

Delft University of Technology, Delft Institute of Applied Mathematics

Pre-PhD, Scientific Computing group, March 2009–March 2010.

PhD fellow, Scientific Computing group, March 2010–till date.

Teaching Assistant in ATHENS course 2012 and 2013.

Involved a Masters Thesis; Fourier Analysis of the Preconditioned Helmholtz Equation for Scattering Problems, L.G. Ramos at TU Berlin, Germany.

Publications

On the convergence of shifted Laplace preconditioner combined with multilevel deflation, Numerical Linear Algebra with Applications. Volume 20, Issue 4, August 2013 pp 645-662.

Accelerating the Shifted Laplace Preconditioner for the Helmholtz Equation by Multigrid Deflation. Submitted (JCP).

An algebraic deflation based solver for high frequency Helmholtz equation. Submitted in Applied Mathematics Letters.

Technical Reports

Fast iterative solution methods for the Helmholtz equation. DIAM Technical Report NW09-11, DIAM, Delft University of Technology, The Netherlands.

A scalable Hemholtz solver combining the shifted Laplace preconditioner with multigrid deflation. DIAM Technical Report NW11-01, DIAM, Delft University of Technology, The Netherlands.

Conferences

Paper presented at Eleventh Copper Mountain conference on Iterative Methods April 2010 at Colorado, USA: Talk title "An efficient iterative scheme for the Helmholtz equation with deflation ".

Paper presented at Fifteenth Copper Mountain Conference on Multigrid Methods, March 2011 at Colorado, USA. Talk title "A scalable Helmholtz solver combining the Deflation with shifted Laplace preconditioner ".

Joint work presented by Prof. Dr. C. Vuik in "ESF OPTPDE Workshop Fast Solvers for Simulation, Inversion, and Control of Wave Propagation Problems"September 26-28, 2011 at University Wurzburg, Wurzburg, Germany. Talk title: "Analysis of the multi-level, shifted Laplace preconditioned method for the Helmholtz equation. "

A collaborated work with H. Knibbe was prestened by Prof. C. Vuik at International Conference on Mathematical Modeling in Industry November 30th - December 2nd, 2011, University of Sao Paulo, Sao Paulo, Brazil. Talk title: "Fast solvers for seismic problems. "

Joint work with Prof. Ira Livshits prestened by Dr. D. Lahaye in Twelfth Copper Mountain Conference on Iterative Methods 25-30 March, 2012 at Colorado, USA. Talk title "On the Complex Shifted Laplacian as Multigrid Smoother for the Helmholtz Equation. "

Work presented by Prof. C. Vuik in Twelfth Copper Mountain Conference on Iterative Methods 25-30 March, 2012 at Colorado, USA. Talk title "On the Convergence of Shifted Laplace Preconditioner Combined with Multigrid Deflation for the Helmholtz equation. "

Joint work presented by Prof. C. Vuik in Werkgemeenschap Scientific Computing Spring Meeting WSC 2012, held on 11 May 2012 in University of Antwerpen, Belgium. Title: "A decade of fast and robust Helmholtz solvers."

Joint work presented by supervisor Prof. C. Vuik in Weizmann Workshop 2013 on Multilevel computational methods and optimization, held on April 30 - May 02, 2013 in Weizmann Institute of Science,Rehovot 76100, Israel.Title: "Deflation type methods combined with shifted Laplace preconditioners for the Helmholtz equation."

Work presented at European Multigrid Conference, September 09-12, 2014, Leuven, Belgium: Talk title "Coarse-grid-correction preconditioner for the Helmholtz Equation ".

Others

Presented in Sparse Days Meeting 2011 at CERFACS, T louse France, September 6th-7th, 2011.

Presented in Mini Symposia at 47th Dutch Mathematical Conference 2011, NMC 2011 held at University of Twente, Twente Netherlands, 14-15 April 2011. Title:"A scalable Helmholtz solver combining the deflation with shifted Laplace preconditioner"

Comsol Multiphysics Modelling Workshop, Technische Universiteit Delft Aula congrescentrum, Delf, The Netherlands October 20, 2009.

Course "Programming on GPU with CUDA" at Delft Centre of Computational Science and Engineering DCSE, Netherlands September 13, 2013.

Study Group Mathematics with Industry at EEMCS Faculty, Delft University of Technology, netherlands, January 27 - 31, 2014.

Posters

Prestented Posters at Four consecutive 34th, 35th , 35th and 37th Dutch-Flemish Woudschoten conferences 2009, 2010, 2011 and 2012, held at Woudschoten conference centrum, Ziest, The Netherlands.

Presented poster at Numerical Linear Algebra - Algorithms, Applications, and Training held at Delft, The Netherlands on April 10-13, 2012.

Professional Activities

Member, Pakistan Mathematical Society, 2008–Present.

Member, Dutch Royal Mathematical Society,, 2012–Present.

Founding Member, Siam Delft Students Chapter, 2012–Present.

Honors

Talent Farming Scholarship (for M.Sc. at QAU Islamabad), by Higher Education Commission of Pakistan, 2005-06.

Merit Scholarship during MPhill at QAU Islamabad.

Miscellaneous

Computer Skills: C++, Matlab, Mathematica, Maple, COMSOL, FreeFEM++, PETSc, and basics of CUDA-GPU.

References

Prof. Dr Kees Vuik
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Delft University of Technology, Netherlands.
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Prof. Ira Livshits
Department of Mathematical Sciences,
Ball State University, Muncie Indiana, USA.
ilivshits@bsu.edu

Prof. Dr Asif Ali
Department of Mathematics,
Quaid-i-Azam University Islamabad, Pakistan.
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