

Curriculum Vitae

Assyr Abdulle

ADDRESS	Chair of Computational Mathematics and Numerical Analysis (ANMC) MATHICSE Ecole Polytechnique Fédérale de Lausanne Station 8 1015 Lausanne, Suisse	Nationality	Swiss (Geneva)
		Date of birth	19 January 1971
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EDUCATION

1997-2001 : **University of Geneva, Switzerland**
Ph.D. in Mathematics, Adviser : Prof. Gerhard Wanner, co-adviser : Prof. Ernst Hairer
Thesis : "Chebyshev Methods Based on Orthogonal Polynomials"

1993-1997: **University of Geneva, Switzerland**
MSc. In Mathematics, Adviser : Prof. Gerhard Wanner
Thesis : "Polynômes de Stabilités pour Equations Différentielles Ordinaires Raides"

1990-1993: **Geneva Professional Conservatory, Switzerland**
Professional and Teaching Diplomas in Violin, under the direction of Prof. Corrado Romano

PROFESSIONAL APPOINTMENTS

2009- present : **Ecole Polytechnique Fédérale de Lausanne (EPFL, Switzerland)**
Professor of Mathematics, Chair of numerical Analysis and Computational Mathematics

2017-2018 : **Founding Director of the Institute of Mathematics (EPFL, Switzerland)**

2016 : **Director of the MATHICSE Institute**

2009-2019 : **Founding Director of the Master in Computational Science (EPFL, Switzerland)**

2007-2008 : **University of Edinburgh, UK**
School of Mathematics
Reader in Mathematics

2006-2007 : **University of Edinburgh, UK**
School of Mathematics
Lecturer in Mathematics

2003-2006 : **University of Basel, Switzerland**
Mathematics Department
Assistant Professor (non-tenure track position)

2002-2003 : **ETH Zürich, Switzerland**
Computational Laboratory (CoLab)
Research Associate

2001-2002 : **Princeton University, USA**
Mathematics Department
Research Fellow (Post Doc.)

1997-2001 : **University of Geneva, Switzerland**
Mathematics Department
Teaching and Research Assistant

1990-1994 : **Geneva Conservatory, Switzerland**
Violin Teacher (Professor Substitute)

AWARDS AND HONORS

- 2016 : **Best Teacher award**, Mathematics Section EPFL
- 2015 : **Best Teacher award**, Mathematics Section EPFL
- 2013 : **SIAM Germund Dahlquist Prize**
- 2009 : **SIAM Wilkinson Prize** in Numerical Analysis and Scientific Computing
- 2009-2013 : **Visiting Professor**, University of Edinburgh, UK
- 2007 : **Edinburgh Mathematical Society**
Elected member since October 2007
- 2007 : **EPSRC Advanced Research Fellowship**
- 2005 : **SciCADE 2005 New Talent Prize**

EDITORIAL ACTIVITIES

- 2021- : Associate editor of MMS: SIAM Journal on Multiscale Modeling and Simulation
- 2012-2020 : Associate editor of the SIAM Journal on Scientific Computing
- 2019- : Associate editor of Calcolo
- 2017- : Associate editor of the Journal of Multiscale Modelling
Associate editor of the Rendiconti del Circolo Matematico di Palermo
- 2015- : Associate editor of the Journal Scientific Computing
- 2014- : Associate editor of the Journal of Elliptic and Parabolic Equation
- 2013- : Associate editor of ESAIM: Mathematical Modeling and Numerical Analysis
- 2012-2020 : Associate editor of the SIAM Journal on Scientific Computing
- 2007-2017 : Associate editor of the Journal of Computational Mathematics
- 2009 : Guest editor for Gakuto International Series, Mathematical Sciences and Applications

GRANTS

- 2018-2021 : Swiss National Foundation: Independent Basic Research Grant 200020_172710: 563 754 CHF
- 2014-2017 : Swiss National Foundation: Independent Basic Research Grant 200021_150019: 328 500 CHF
- 2012-2014 : Swiss National Foundation: Independent Basic Research Grant 200021_140692: 109 858 CHF
- 2011-2014 : Swiss National Foundation: Independent Basic Research Grant 200021_134716: 218 493 CHF
- 2008 : ICMS-EPSRC grant to organize an International Workshop (Adaptivity, robustness and complexity of multiscale algorithms) 50 000 GBP (with A. Stuart and B. Engquist, co-organizers)
- 2007-2012 : EPSRC Advanced Research Fellowship Grant EP / E05207X/1: 553 112 GBP: 1.3 million CHF (at the time of award)
- 2007 : Royal Society Grant: 750 GBP
- 2004 : Swiss National Foundation: Independent Basic Research Grant 200021-103863/1, 15 000 CHF
- 2001 : Swiss National Foundation: Fellowship Project no. 65901, 42 000 CHF

PROFESSIONAL ACTIVITIES

EPFL

- 2017-2018 : Director of the Institute of Mathematics
- 2016 : Director of MATHICSE Institute
- 2016-2018 : Member of the Direction of the School of Basic Sciences
- 2016 : Directeur-elect in charge of merging the three institutes of mathematics at EPFL, MATHAA, MATHGEOM, MATHICSE into a single Institute of Mathematics
- 2011-2014 : Member of the FSB tenure committee
- 2010-2017 : Member of the permanent math search committee at EPFL
- 2009-2019 : Director of the Master in Computational Science and Engineering (CSE) at EPFL and Member of the Mathematics Master admission committee for the CSE Master
- 2009-2021 : Member and Chair (since 2014) of the IBM-EPFL Master prize committee in computational science
- 2009- : MATHICSE Seminar organizers (joint with MATHICSE Faculty members)

External activities

- 2016- : Vice chair of SWICCOMAS
- 2014- : Core member of the ECCOMAS Committee on Computational and Applied Mathematics
- 2017 : Member of the committee for the SIAM Wilkinson prize 2017
- 2016 : Member of the ECCOMAS Award Committee
- 2014 : Expert DFG Collaborative Research Center Scaling Cascades in Complex Systems
- 2009- : Invitation as expert for the French (ANR), Dutch (NWO), Swedish and ERC research councils

Edinburgh University

- 2007-2009: Member of the Strategic Research Committee, School of Mathematics
Member of the BTG (bridging the gap) group in Synthetic Biology (joint project with the Schools of Mathematics, Informatics, Engineering & Electronics, biological Sciences, Physics and Chemistry)
Member of the EPSRC (Engineering and Physical Sciences Research Council), Peer review College for the period ending 31 December 2009

University of Basel

- 2004-2006 : Member of the Computational Sciences committee (Mathematics, Computer Science and Physics)
Member of the committee for new Interdisciplinary Curriculum in computational Sciences
Member of SytemsX (Glue project)
EUCOR Colloquium organizer (joint colloquium Basel, Freiburg, Strasbourg)

PLENARY TALKS AT MAJOR INTERNATIONAL CONFERENCES

- 2019 : **WAVES 2019**, 14th International Conf. on Mathematical and Numerical Aspects of Wave propagation (Vienna, Austria)
- 2016 : **ECCOMAS** Congress (Crete, Greece)
- 2015 : **28th Chemnitz** Finite Element Symposium (Chemnitz, Germany)
ENUMATH 2015 (Ankara, Turkey)
Frontiers of Applied and Computational Mathematics (Beijing, China)

- 2014 : **CANUM 2014**, 42ème congrès national d'analyse numérique (Aix-Marseille, France)
Annual meeting of the UK "Porous Media – Processes and Mathematics" research network (Edinburgh, Scotland)
- 2013 : **SciCADE 2013** (Valladolid, Spain)
25th Biennial Numerical Analysis conference (Glasgow, Scotland)
- 2012 : **ICNAAM 2012** (Kos, Greece)
- 2011 : **Isaac Newton Institute (INI) and the Wales Institute for Mathematical and Computational Sciences (WIMCS)** meeting on **Computational challenges in Partial Differential Equations** (Swansea, UK)
- 2010 : **ESF Conference: Highly Oscillatory Problems: From Theory to Applications** (INI, Cambridge, UK)
- 2009 : **SIAM annual meeting** (Denver, US)
International Conference on Scientific Computing celebrating Ernst Hairer's 60th birthday (Geneva, Switzerland)
Swiss Numerical Analysis colloquium (Basel, Switzerland)
ISFMA Symposium (Fudan, China)
- 2006 : **Scottish Computational Mathematics Symposium** (Edinburgh, UK)
NUMDIFF11: Conference on Numerical treatment of Differential-Algebraic equations (Halle, Germany)
- 2005 : **SciCADE 2005**: International Conference on Scientific Computation and Differential Equations (Nagoya, Japan)

PLENARY SPEAKER AT INTERNATIONAL CONFERENCES, WORKSHOPS, MINISYMPOSIA, GUEST LECTURER

- 2020 : Workshop on deterministic and stochastic dynamical system (Geneva, Switzerland)
Modéliser le réel (Collège de Saussure, Genève, Switzerland)
CECAM Multiscale simulations of soft matter: New method developments and mathematical foundations (Mainz, Germany)
- 2019 : Oberwolfach Workshop, Computational Multiscale Methods (Oberwolfach, Germany)
SciCADE 2019 (Innsbruck)
MAFELAP 2019 (London)
Workshop HaLu-2019, Gran Sasso Science Institute (GSSI) School of Advanced Studies (L'Aquila)
SIAM Conference on Computational Science and Engineering (CSE19) (Spokane, USA)
- 2018 : BIRS Workshop, Integrating the Integrators for Nonlinear Evolution Equations: from Analysis to Numerical Methods, High-Performance-Computing and Applications (Banff, Canada)
9th Workshop on Numerical Methods for Evolution Equations (Heraklion, Crete)
Workshop on Numerical Methods for Multiscale PDEs (Cargèse, Corsica, France)
Oberwolfach Workshop Reactive Flows in Deformable, Complex Media (Oberwolfach)
12th AIMS Conference on Dynamical Systems, Differential Equations and Applications (3-9 July, Taipei, Taiwan)
Workshop on Interplay of multiscale data assimilation and data science with advanced PDE discretizations, Erwin Schrödinger International Institute for Mathematics and Physics (ESI) (Vienna, Austria)
Eccomas ECCM – ECFD 2018 (Glasgow, UK)
Sixth Scottish Partial Differential Equation Colloquium (Edinburgh, Scotland)
Workshop on Data-Driven Modelling of Complex Systems (Alan Turing Institute, UK)
Workshop on Analytical and numerical aspects of wave propagation in complex structures (Münster, Germany)
- 2017 : Stepping Stone Symposium on Theoretical and Numerical Analysis of PDEs (Geneva, Switzerland)
ICERM, Waves and Imaging in Random Media (Brown, USA)
HIM, Workshop on Numerical Inverse and Stochastic Homogenization (Bonn, Germany)
International conference on Domain Decomposition Methods (Svalbard, Norway)
Workshop on "Multiscale methods for stochastic dynamics" (Geneva, Switzerland)

- 2016 :
- Workshop METAMATH: Waves in periodic media and metamaterials (Cargèse, Corsica, France)
 - 8th Multiscale Materials Modeling (MMM) international conference (Dijon, France)
 - 8th Workshop Numerical Methods for Evolution Equations (Heraklion, Greece)
 - ICERM Stochastic numerical algorithms, multiscale modeling and high-dimensional data analytics (Brown, USA)
 - Stochastic dynamical systems in biology: Numerical methods and applications (Cambridge, UK)
 - Geometric Numerical Integration (Oberwolfach, Germany)
 - ICMS Multiscale methods for stochastic dynamical systems in biology (Edinburgh, UK)
 - BIRS Workshop Computational and Numerical Analysis of Transient Problems in Acoustics, Elasticity and Electromagnetism (Banff, Canada)
- 2015 :
- ICIAM 2015 (Beijing, China)
 - Workshop, Developments in the Theory of Homogenization (Banff, Canada)
 - EUROMECH Colloquium 559, Multi-scale computational methods for bridging scales in materials and structures (Eindhoven, The Netherlands)
 - International Workshop on Computational Mathematics (Qingdao, China)
 - Workshop on Multiscale Numerical Methods for Differential Equations, Centre Henri Lebesgue (Rennes, France)
 - Oberwolfach Workshop, New Discretization Methods for the Numerical Approximation of PDEs (Oberwolfach, Germany)
- 2014 :
- NAIS Workshop on Numerical Algorithms and Intelligent Software (Edinburgh, UK)
 - International conference on Numerical Analysis for Partial Differential Equations (Sussex, UK)
 - Workshop on Numerical Methods on High-Performance Computers, DFG programme Software for Exascale Computing (Heidelberg, Germany)
 - Oberwolfach Workshop, Interplay of Theory and Numerics for Deterministic and Stochastic Homogenization (Oberwolfach, Germany)
 - Building Bridges: Connections and Challenges in Modern Approaches to Numerical Partial Differential Equations (Durham, UK)
 - International Workshop on Numerical Methods and Emerging Computational Challenges in Mathematical Biology (Dundee, Scotland)
- 2013 :
- International Workshop on Numerical Methods of Stochastic Differential Equations (Beijing, China)
 - Workshop on Asymptotic and Multiscale methods (Porquerolles, France)
 - Oberwolfach Workshop, New Discretization Methods for the Numerical Approximation of PDEs (Oberwolfach, Germany)
 - Workshop on Multiscale Modeling and Computing (Lorentz Center, Leiden, Netherlands)
 - EMS-DMF mathematical weekend in Aarhus (Aarhus, Denmark)
 - Winter School Transport in micro-structured media, GDR CHANT, CNRS (Grenoble, France)
- 2012 :
- Dobiaccio, Summer School on innovative methods for stiff ODEs and PDEs (Dobiaccio, Italy)
 - IPAM, Computational Methods for Multiscale Modeling of Materials Defects (Los Angeles, USA)
 - ICMS Conference on Scale transition in Chemistry and biology (Edinburgh, UK)
- 2011 :
- Workshop on Homogenization and Multiscale Analysis (Fudan, China)
 - Oberwolfach Workshop, Geometric Numerical Integration (Oberwolfach, Germany)
 - KAUST-IAMCS Workshop (Thuwai, Saudi Arabia)
 - Workshop on Numerical Analysis of Multiscale Problems and Stochastic Modelling, RICAM special semester on Multiscale Simulation and Analysis in Energy and the Environment (Linz, Austria)
 - Conference on Modern Techniques for the numerical solution of PDEs, Archimedes Center ACMA (Crete, Greece)
 - Conference on Analytical and numerical methods for multiscale systems (Match) (Heidelberg, Germany)
- 2010 :
- CECAM-ESF Conference, Multiscale Modeling and Simulation (Ittingen, Switzerland)
 - LMS EPSRC Durham Symposium (Durham, UK)
 - International Workshop: Frontiers in Computational Astrophysics, Centre Blaise Pascal, ENS (Lyon, France)

- 2009 : Princeton Workshops on multiscale problems (Princeton, US)
FoCM 09 (Hong-Kong)
BIRS Workshop, Numerical Analysis of Multiscale Computations (Banff, Canada)
- 2008 : First International conference on Frontiers in Computational Mathematics (Guilin, China)
NASPDE 08: Numerical analysis of stochastic PDEs (ETH Zurich, Switzerland)
- 2007 : Workshop on Effective Computational Methods for Highly Oscillatory Solutions, Isaac Newton Programme HOP (Cambridge, UK)
Workshop on Numerical Modeling of Complex Dynamical Systems, Lorentz center (Leiden, the Netherlands)
Princeton Workshops on multiscale problems (Princeton, US)
ICIAM 2007 (Zurich, Switzerland)
LMS-EPSRC course on Multiscale Methods (Warwick, UK)
- 2006 : Oberwolfach Workshop, Geometric Numerical Integration (Oberwolfach, Germany)
- 2005 : The 2nd International Conference on Scientific Computing and Partial Differential Equation, The First East Asia SIAM Symposium SIAM (Hong Kong)
5th International Conference on Large-Scale Scientific Computations (LSSC) (Sozopol, Bulgaria)
Oberwolfach Workshop, Reactive Flow and Transport Through Complex Systems (Oberwolfach, Germany)
- 2001 : SciCADE 2001 (Vancouver, Canada)
- 1999 : SciCADE 1999 (Fraser Island, Australia)

INVITED RESEARCH VISITS, COURSE LECTURER, SUMMER SCHOOL LECTURER

- 2017 : Imperial College, invited professor by Prof. Greg Pavliotis (UK, 2 weeks)
- 2016 : Newton Institute SDB (Cambridge, UK, 2 weeks)
- 2012 : Invited course lecturer at Dobiacco Summer School (Bolzano, Italy, 1 week)
- 2010 : London Mathematical Society Symposium on Numerical analysis of multiscale Problems (Durham, UK, 2 weeks)
- 2009 : ISFMA Symposium and Summer School on Multiscale problems (Fudan University, China, 2 weeks)
- 2008 : Peking University, invitation by Prof. Tiejun Li (China, 2 weeks)
Basel University, invitation by Prof. M. Grote (Switzerland, 2 weeks)
- 2007 : CIMPA-UNESCO School, Multiscale Problems, invited course lecturer on Multiscale Modelling, Computation and Analysis (African Institute of Mathematical Sciences, South Africa, 2 weeks)
Princeton University, invited professor by Prof. Weinan E (USA, 4 weeks)
University of Geneva, invited professor by Profs. E. Hairer and G. Wanner (Switzerland, 10 weeks)
Cambridge, Newton Institute for Mathematical Sciences, Visiting Fellow, "Highly Oscillatory Problems" (UK, 7 weeks)
LMS-EPSRC course on Multiscale Methods (Warwick, UK, 1 week)
- 2006 : Peking University, invited professor, course on Explicit Methods for Stiff Dynamical Systems (China, 4 weeks)
- 2003 : ETH Zürich, Workshop in Multiscale Modeling and Simulation (Switzerland, 4 weeks)
- 1998 : Russian Academy of Science, invitation of Prof. V.I. Lebedev (Russia, 1 week)

INVITED COLLOQUIUM AND SEMINAR

Basel University (Switzerland 2018), Imperial College AMMP Colloquium (UK, 2017), University of Stuttgart SimTech MOR-Seminar (Germany 2015), University of Manchester (UK 2014), Besançon University (France, 2014), ENS Lyon (France, 2013), MMM (MRS, Singapore, 2012), Oxford (UK, 2011), INRIA Rocquencourt and CNRS Paris (France 2010), CERMICS (Ecole National des Ponts et Chaussées, France, 2010), Dundee University (UK, 2010), Rencontre annuelle de la Société Mathématiques Suisse (Switzerland, 2009), Hong Kong Baptist University, University of Science and Technology, USTC, (China , 2009), Princeton University (US, 2009), SciCADE09 (Beijing, China, 2009), Warwick University (UK, 2009), 8th WCCM and 5th ECCOMAS (Venice, Italy, 2008), University of Edinburgh (UK, 2008), University of Glasgow (UK, 2008), University of Stirling (UK, 2008), Heriot-Watt University (UK, 2008), Imperial College (UK, 2008), Swiss Federal Institute of Technology (EPFL- Switzerland, 2008), Bern University (Switzerland, 2007), University of Nottingham (UK, 2007), University of Geneva (Switzerland, 2007), University of Strathclyde (UK, 2006), Chinese Academy of Sciences (China, 2006), Innsbruck University (Austria, 2006), Tübingen University (Germany, 2006), University of Edinburgh (UK, 2006), TU Eindhoven (the Netherlands, 2005), ETH Zürich (Switzerland, 2005), Basel University (Switzerland, 2004), Tübingen University (Germany, 2003), ETH Zürich (Switzerland, 2003), University of Geneva (Switzerland, 2003), ETH Zürich (Switzerland, 2002), Princeton University (US, 2002), Tulane University (US, 2002), Rencontre annuelle de la Société Mathématiques Suisse (Switzerland, 1999), Russian Academy of Science (Russia, 1998).

RECENT CONFERENCE ORGANIZED

- 2021 : **New trends in numerical multiscale methods and beyond** (July 12-16 Mittag-Leffler Institute, Sweden)
- 2017 : **SciCADE17**, Minisymposium organizer: Multiscale methods (Bath, UK)
- 2014 : **NASPDE 14: Workshop on numerical analysis of stochastic PDEs** (EPFL, Switzerland)
Multiscale methods and high performance computing (Edinburgh, UK)
- 2013 : **Enumath Conference 2013** (EPFL, Switzerland)
SciCade13, Minisymposium organizer: Multiscale Modelling (Valladolid, Spain)
Enumath Conference 2013 (EPFL, Switzerland)
- 2009 : **ICMS workshop organizer**, Workshop on Adaptivity, robustness and complexity of Multiscale algorithms with B. Engquist and A. Stuart (Edinburgh, UK)
SciCADE09, Minisymposium organizer: Stiff and multiscale problems with P. Lin (Beijing, China)
- 2007-2008 : **Maxwell Institute for Mathematics Sciences**, Organiser of the Maxwell Seminar in Computational Mathematics joint bi-annual meeting with Heriot-Watt University, with L. Boulton, (Edinburgh, UK)
- 2007 : **ICIAM 07**, Minisymposium organizer: Multiscale methods for Strongly Heterogeneous Media (ETH Zürich)

POST-DOC MENTORING

- Dr. Léa Nicolas - ongoing
- Dr. Giacomo Rosilho De Souza - ongoing
- Dr. Doghonay Arjmand – 01.09.2019 – Associate Professor - Mälardalen University, Sweden
- Dr. Timothée Pouchon - 31.08.2019 – FNS Post Doc University of Edinburgh
- Dr. Simon Lemaire - 31.12.2017 – INRIA Researcher, France
- Dr. Dario Bojanjac – 31.03.2017 – Assistant Professor University of Zagreb
- Dr. Martin Huber – 31.01.2016 – Teacher, Kloster Disenstis High School, Switzerland
- Dr. Patrick Henning - 31.07.2014 – Associate Professor, KTH, Sweden
- Dr. Konstantinos Zygalakis 2012 – Lecturer, University of Edinburgh
- Dr. Gilles Vilmart – 31.08.2011 – Senior lecturer (MERF) at University of Geneva, Section of Mathematics
- Dr. Alexander Shapeev - 15.08.2011 – Associate Professor, Skoltech Faculty, Russia

PhD THESIS DIRECTOR

Andrea Zanoni – 2019- ongoing

Giacomo Garegnani – 2017- ongoing

Dr. Edoardo Paganoni - 2016-2020 - Novel corrector problems with exponential decay of the resonance error for numerical homogenization

Dr. Giacomo Rosilho De Souza - 2015-2020 - Numerical methods for deterministic and stochastic differential equations with multiple scales and high contrasts

Dr. Andrea Di Blasio - 2014-2019 - Penalization and Bayesian numerical methods for multiscale inverse problems

Dr. Timothée Pouchon - 2013-2017 - Effective models and numerical homogenization methods for long time wave propagation in heterogeneous media

Dr. Orane Jecker Pouchon - 2012-2016 - Optimization based methods for highly heterogeneous multiscale problems and multiscale methods for elastic waves

Dr. Ondrej Budac - 2012-2016 - Multiscale methods for Stokes flow in heterogeneous media

Dr. Martin Huber - 2011-2015 - Numerical homogenization methods for advection-diffusion and nonlinear monotone problems with multiple scales

Dr. Adrian Blumenthal - 2011-2015 - Stabilized Numerical Methods for Stochastic Differential Equations driven by Diffusion and Jump-Diffusion Processes

Dr. Yun Bai - 2009-2013 - Reduced order modeling techniques for numerical homogenization methods applied to linear and nonlinear multiscale problems

Dr. Achim Nonnenmacher - 2009-2011 - Adaptive Finite Element Methods for Multiscale Partial Differential Equations

MSc THESIS DIRECTOR

Andrea Zanoni – 2019 - Ensemble Kalman filter for multiscale inverse problems

Lia Gander – 2018 - Optimized Chebyshev methods for discrete stochastic simulations

Aleska Stankovic – 2017 - Probabilistic methods for differential equations: adaptivity and Bayesian inverse problems

Giacomo Garegnani – 2016 - Heterogeneous finite element multiscale method for the Stokes-Brinkman problem

Elisabeth Speyer – 2015 - High order numerical methods for the invariant measure of stochastic differential equations

Antoine Imboden – 2015 - Heterogeneous finite element multiscale method for the Stokes-Brinkman problem

Baptiste Jollien – 2015 - A multiscale project in the context of elastic composites

Giacomo Rosilho de Souza – 2014 - Application of stabilized explicit Runge-Kutta methods to the incompressible Navier-Stokes equations

Francesco Casalegno – 2014 - Numerical Methods for Low-Thrust Trajectory Optimization

Jonathan Rochat – 2012 - An Implicit Finite Element Method for the Landau-Lifshitz-Gilbert Equation with exchange and Magnetostriction

Sylvain Rouge – 2011 - Study of resonance error in numerical homogenization

Adrian Blumenthal – 2011 - The Multilevel Monte Carlo Method for SDEs driven by Jump-Diffusions with Applications in Finance

Abdelaziz Belqadhi – 2010 - Runge-Kutta-Chebyshev methods for jump-diffusion stiff stochastic differential equations

Katrin Lindenberger – 2005 - Kombination der unsteady Galerkin-Methode und der heterogenen Multiskalen-Methode für elliptische Homogenisierungsprobleme, University of Basel

Oliver Dietiker – 2005 - Finite Volume Heterogeneous Multiscale Methods MSc. (minor) thesis in Mathematics and Physics, University of Basel

Cyrill Baer – 2005 - Numerical Heterogeneous Multiscale Methods for Ordinary Differential Equations, MSc. (minor) thesis in Mathematics and Physics University of Basel

LIST OF PUBLICATIONS

Journal Articles

For preprint see <https://www.epfl.ch/labs/anmc/publications/> or <https://arxiv.org/search/?query=abdulle&source=header&searchtype=all>

93. A. Abdulle and G. Garegnani. Random time step probabilistic methods for uncertainty quantification in chaotic and geometric numerical integration, in *Statistics and Computing*, vol. 30, num. 4, p. 907-932, 2020.

A. Abdulle and A. Di Blasio. A Bayesian numerical homogenization method for elliptic multiscale inverse problems, in *SIAM/ASA Journal of Uncertainty Quantification*, vol. 8, num. 1, p. 414-450, 2020.

A. Abdulle, D. Arjmand and E. Paganoni. Exponential decay of the resonance error in numerical homogenization via parabolic and elliptic cell problems, in *Comptes Rendus Mathématique (Académie des Sciences Paris)*, vol. 357, num. 6, p. 545-551, 2019.

A. Abdulle and G. Rosilho de Souza. A local discontinuous Galerkin gradient discretization method for linear and quasilinear elliptic equations, in *ESAIM Mathematical Modelling and Numerical Analysis*, vol. 53, num. 4, p. 1269-1303, 2019.

A. Abdulle, G.A. Pavliotis and G. Vilmart. Accelerated convergence to equilibrium and reduced asymptotic variance for Langevin dynamics using Stratonovich perturbations, in *Comptes Rendus Mathématique (Académie des Sciences Paris)*, vol. 357, num. 4, p. 349-354, 2019.

A. Abdulle and A. Di Blasio. Numerical homogenization and model order reduction for multiscale inverse problems, in *Multiscale Modeling and Simulations*, vol. 17, num. 1, p. 399-433, 2019.

A. Abdulle and T. Pouchon. Effective models for long time wave propagation in locally periodic media, in *SIAM Journal on Numerical Analysis*, vol. 56, num. 5, p. 2701-2730, 2018.

A. Abdulle, I. Almuslimani and G. Vilmart. Optimal explicit stabilized integrator of weak order 1 for stiff and ergodic stochastic differential equations, in *SIAM/ASA Journal on Uncertainty Quantification*, vol. 6, num. 2, p. 937-964, 2018.

A. Abdulle, M.J. Grote and O. Jecker. Finite element heterogeneous multiscale method for elastic waves in heterogeneous media, in *Computational Methods in Applied Mechanics and Engineering*, vol. 335, p. 1-23, 2018.

A. Abdulle and O. Jecker. On heterogeneous coupling of multiscale methods for problems with and without scale separation, in *Research in the mathematical Sciences*, 4, Paper No. 28, 23 pp, 2017.

A. Abdulle. Numerical methods for stochastic simulation: when stochastic integration meets geometric numerical integration, in *Stochastic processes, multiscale modeling, and numerical methods for computational cellular biology*, p. 83-107, Springer, Cham, 2017.

A. Abdulle, G.A. Pavliotis and U. Vaes. Spectral methods for multiscale stochastic differential equations, in *SIAM/ASA Journal on Uncertainty Quantification*, vol. 5, num. 1, p. 720-761, 2017.

A. Abdulle and P. Henning. Multiscale methods for wave problems in heterogeneous media, in *Handbook of numerical methods for hyperbolic problems*, *Handb. Numer. Anal.*, vol. 18, p. 545-576, Elsevier/North-Holland, Amsterdam, 2017.

A. Abdulle and M.E. Huber. Numerical homogenization method for parabolic advection-diffusion multiscale problems with large compressible flows, in *Numerical Mathematics*, vol. 136, no. 3, p. 603-649, 2017.

A. Abdulle, Assyr, M.E. Huber and S. Lemaire. An optimization-based numerical method for diffusion problems with sign-changing coefficients, in *Comptes Rendus Mathématiques (Académie des Sciences Paris)*, vol. 355, num. 4, p. 472-478, 2017.

A. Abdulle, Assyr, O. Budáč and A. Imboden. A three-scale offline-online numerical method for fluid flow in porous media, in *Journal of Computational Physics*, vol. 337, p. 175-202, 2017.

- 77.A. Abdulle and O. Budáč. A discontinuous Galerkin reduced basis numerical homogenization method for fluid flow in porous media, in *SIAM Journal on Scientific Computing*, vol. 39, num. 1, p. A83-A113, 2017.
- A. Abdulle and P. Henning. Localized orthogonal decomposition method for the wave equation with a continuum of scales, in *Mathematics of Computation*, vol. 86, num. 304, p. 549-587, 2017.
- A. Abdulle and O. Budáč. Multiscale model reduction methods for flow in heterogeneous porous media, in *Numerical mathematics and advanced applications—ENUMATH 2015*, vol. 112, p. 333-349, *Lect. Notes Comput. Sci. Eng.*, Springer, [Cham], 2016.
- O. Jecker and A. Abdulle. Numerical experiments for multiscale problems in linear elasticity in *Numerical mathematics and advanced applications—ENUMATH 2015*, vol. 112, p. 123-131, *Lect. Notes Comput. Sci. Eng.*, Springer, [Cham], 2016.
- A. Abdulle and T. Pouchon. Effective models for the multidimensional wave equation in heterogeneous media over long time and numerical homogenization in *Mathematical Models Methods in Applied Sciences*, vol. 26, num. 14, p. 2651-2684, 2016.
- A. Abdulle. Numerical homogenization methods for parabolic monotone problems in *Building bridges: connections and challenges in modern approaches to numerical partial differential equations*, vol. 114, p. 1-38, *Lect. Notes Comput. Sci. Eng.*, Springer, [Cham], 2016.
- A. Abdulle and M. E. Huber. Finite element heterogeneous multiscale method for nonlinear monotone parabolic homogenization problems in *ESAIM Mathematical Modeling and Numerical Analysis*, Vol. 50, num. 6, p. 1659-1697, 2016.
- A. Abdulle, O. Jecker and A. Shapeev. An optimization based coupling method for multiscale problems, in *Multiscale Modeling Simulations*, vol. 14, num. 4, p. 1377-1416, 2016.
- A. Abdulle and O. Budáč. A reduced basis finite element heterogeneous multiscale method for Stokes flow, in porous media in *Computational Methods Appl. Mech. Engrg*, Vol. 307, p. 1-31, 2016.
- A. Abdulle, Assyr and T. Pouchon. A priori error analysis of the finite element heterogeneous multiscale method for the wave equation over long time, in *SIAM Journal of Numerical Analysis*, vol. 54, num. 3, p. 1507-1534, 2016.
- A. Abdulle and M.E. Huber. Error estimates for finite element approximations of nonlinear monotone elliptic problems with application to numerical homogenization in *Numerical Methods Partial Differential Equations*, vol. 32, num. 3, p. 955-969, 2016.
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- DS-FE-HMM a short matlab implementation of 2D and 3D multiscale Stokes to Darcy problems using DG FEM and reduced basis. Version of 2016.
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