

Curriculum Vitae (Mechthild Thalhammer)

Address

Mechthild Thalhammer
Leopold–Franzens Universität Innsbruck
Fakultät für Mathematik, Informatik und Physik (MIP)
Institut für Mathematik
Technikerstraße 13/VII
6020 Innsbruck
Austria

Email. Mechthild.Thalhammer@uibk.ac.at

Web. <http://techmath.uibk.ac.at/mecht/>

Phone. +43 (0)512 507 53874

Fax. +43 (0)512 507 53899

Educational data and academic history

Personal data

Name, First name	Thalhammer, Mechthild Maria Franziska
Title	Univ.-Prof. Dr. Mag. rer. nat.
Gender	Female
Dates of birth	April 22, 1974, Innsbruck, Austria
Parents	Lill-Astrid and Johann Thalhammer
Citizenship	Austrian

Educational data

1980 – 1984	Primary school, Völs
1984 – 1992	Secondary school <i>Bundesgymnasium und Bundesrealgymnasium Sillgasse</i> , Innsbruck
June 15, 1992	School leaving examination (mit Auszeichnung)
1989 – 1994	Conservatory <i>Tiroler Landeskonservatorium</i> (Subject flute)
1992 – 2001	Study of Mathematics, Universität Innsbruck
March 22, 1997	Mag. rer. nat. (Universität Innsbruck, mit Auszeichnung)
January 17, 2001	Dr. rer. nat. (Universität Innsbruck, mit Auszeichnung)
June 12, 2006	Habilitation colloquium

Academic history (Universität Innsbruck)

October 1998 – June 1999	<i>Studienassistentin</i> , Institut für Technische Mathematik, Geometrie und Bauinformatik
October 1999 – April 2000	<i>Vertragsassistentin</i> (50%, substitute), Institut für Technische Mathematik, Geometrie und Bauinformatik
October 2000 – October 2004	<i>Vertragsassistentin</i> (50%), Institut für Technische Mathematik, Geometrie und Bauinformatik
October 2004 – September 2006	<i>Vertragsassistentin</i> , Institut für Mathematik
October 2006 – February 2014	<i>Vertragsdozentin</i> , Institut für Mathematik
Since March 2014	<i>Professorin §99 (3)</i> , Institut für Mathematik

Visiting position, Professorship (substitute)

October 2001 – September 2002	<i>Charge d'enseignement suppléant</i> , Section de Mathématiques, Université de Genève, Switzerland
October 2011 – June 2012	Vertretungsprofessur <i>Numerische Methoden in der Luft- und Raumfahrttechnik</i> (W3), Fakultät für Luft- und Raumfahrttechnik, Universität der Bundeswehr München, Germany

Berufungsverfahren

Universitätsprofessur für Angewandte Analysis, Institut für Mathematik, Alpen-Adria-Universität Klagenfurt, 2010/11, 2. Listenplatz

W2-Professur für Mathematik insbesondere Numerik, Fakultät für Mathematik, Universität Bielefeld, 2012/13, 3. Listenplatz

Teaching activities

Teaching activities (Universität Innsbruck)

Academic year 1998/1999	<i>Mathematik A & B</i> (Exercises)
Academic year 1999/2000	<i>Wissenschaftliches Rechnen</i> (Exercises), <i>Mathematik B</i> (Exercises)
Academic year 2000/2001	<i>Wissenschaftliches Rechnen</i> (Exercises), <i>EDV für Bauingenieure</i> (Exercises), <i>Mathematik B</i> (Exercises)
Academic year 2002/2003	<i>Mathematik 1 & 2</i> (Exercises), <i>Informatik</i> (Exercises), <i>Numerische Mathematik</i> (Exercises)
Academic year 2003/2004	<i>Mathematik 1 – Differential- und Integralrechnung</i> (Lecture), <i>Mathematik 1 & 2</i> (Exercises), <i>Numerische Mathematik</i> (Exercises)
Winter term 2004/2005	<i>Mathematik für Physiker 2 – Analysis</i> (Lecture), <i>Höhere Analysis</i> (Exercises)
Academic year 2005/2006	<i>Analysis 1 & 2</i> (Exercises), <i>Numerische Analysis</i> (Lecture, Exercises), <i>Numerische Mathematik 2</i> (Exercises)
Academic year 2006/2007	<i>Analysis 1</i> (Exercises), <i>Analysis 2</i> (Lecture), <i>Numerische Analysis</i> (Lecture, Exercises), <i>Numerische Lineare Algebra</i> (Exercises), <i>Algorithmische Mathematik 2</i> (Lecture), <i>Mathematikprojekt an Pflichtschulen</i> (Practical exercises)
Academic year 2007/2008	<i>Numerische Mathematik 1 & 2 (Diplom)</i> (Lecture, Exercises), <i>Numerische Mathematik 1 & 2 (Bachelor)</i> (Practical exercises), <i>Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2008/2009	<i>Numerische Mathematik 1 & 2 (Bachelor)</i> (Lecture), <i>Numerik partieller Differentialgleichungen</i> (Lecture, Exercises), <i>Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2009/2010	<i>Einführung in die Mathematik 1</i> (Exercises), <i>Seminar Problemlösen</i> , <i>Numerik partieller Differentialgleichungen</i> (Lecture, Exercises), <i>Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2010/2011	<i>Einführung in die Mathematik 1</i> (Exercises), <i>Seminar Problemlösen</i> , <i>Numerik partieller Differentialgleichungen</i> (Lecture, Exercises), <i>Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2012/2013	<i>Lineare Algebra</i> (Exercises), <i>Numerische Verfahren für Differentialgleichungen I – Strukturerhaltende Algorithmen für gewöhnliche Differentialgleichungen</i> (Lecture), <i>Algebra II</i> (Exercises), <i>Numerik partieller Differentialgleichungen – Theorie und Anwendungen</i> (Lecture, Exercises), <i>Konversationen zur Vorbereitung der ersten und zweiten Diplomprüfung im Lehramtsstudium</i> , <i>Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)

Academic year 2013/2014	<i>Lineare Algebra</i> (Exercises), <i>Seminar Teilgebiete der Mathematik: Mathematische Modelle in der Bildverarbeitung und deren numerische Lösung, Modellierung mit partiellen Differentialgleichungen</i> (Lecture, Exercises), <i>Seminar mit Bachelorarbeit, Konversatorien zur Vorbereitung der ersten und zweiten Diplomprüfung im Lehramtsstudium, Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2014/2015	<i>Stochastische partielle Differentiagleichungen I</i> (Lecture, Exercises), <i>Mathematische Grundlagen der Quantenmechanik</i> (Lecture, Exercises), <i>Modellierung mit partiellen Differentialgleichungen</i> (Lecture, Exercises), <i>Seminar Modelle der nicht-linearen Akustik und deren numerische Lösung, Konversatorien zur Vorbereitung der ersten und zweiten Diplomprüfung im Lehramtsstudium, Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2015/2016	<i>Stochastische partielle Differentiagleichungen II</i> (Lecture, Exercises), <i>Operatortheorie I</i> (Lecture, Exercises), <i>Spektraltheorie und Anwendungen in der Quantenmechanik</i> (Lecture), <i>Numerical methods for models in atmospheric sciences</i> (Lecture, Exercises), <i>Forschungsseminar Angewandte Mathematik, Konversatorien zur Vorbereitung der ersten und zweiten Diplomprüfung im Lehramtsstudium, Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2016/2017	<i>Grundlagen der Operatortheorie</i> (Lecture, Exercises), <i>Stochastische partielle Differentiagleichungen</i> (Lecture, Exercises), <i>Spektraltheorie und Anwendungen in der Quantenmechanik</i> (Lecture), <i>Numerical methods for models in atmospheric sciences</i> (Lecture, Exercises), <i>Seminar Teilgebiete der Mathematik: Differentialgleichungen und Anwendungen, Konversatorien zur Vorbereitung der ersten und zweiten Diplomprüfung im Lehramtsstudium, Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)
Academic year 2017/2018	<i>Partielle Differentialgleichungen</i> (Lecture, Exercises), <i>Stochastische partielle Differentiagleichungen</i> (Lecture, Exercises), <i>Spektraltheorie und Anwendungen in der Quantenmechanik</i> (Lecture), <i>Numerical methods for models in atmospheric sciences</i> (Lecture), <i>Forschungsseminar Nichtlineare Akustik, Konversatorium zur Vorbereitung der zweiten Diplomprüfung im Lehramtsstudium, Mathematisches Schulprojekt – Mathe-Cool!</i> (Practical exercises)

Other teaching activities

Academic year 2001/2002	<i>Analyse Numérique</i> (Lecture, Exercises, Practical exercises), Université de Genève
Academic year 2002/2003/2004	<i>Mathematik 1 & 2</i> (Lecture), Private Universität für Medizinische Informatik und Technik Tirol (UMIT)
Academic year 2003/2004	<i>Mathematik 1 & 2</i> (Lecture), <i>Mathematik 3 – Numerische Mathematik</i> (Lecture), Private Universität für Medizinische Informatik und Technik Tirol (UMIT)
Academic year 2011/2012	<i>Numerische Mathematik I</i> (Autumn and spring trimester 2011/12, Lecture, Exercises), <i>Numerische Mathematik II</i> (Winter trimester 2012, Lecture, Exercises), Universität der Bundeswehr München

Lecture

Spring School on *Analytical and Numerical Aspects of Evolution Equations 2009* (Berlin, Germany) organised by E. Emmrich and P. Wittbold. Lecture on *Time-splitting spectral methods for nonlinear Schrödinger equations*.

Diploma, doctoral, and post-doctoral students

Abbau Jochen	Post-doctoral student (2010–2011).
Bußlehner Ingrid	Diploma thesis <i>Die numerische Interpolation und ihre Einbindung in den Schulunterricht</i> (Lehramtsstudium Mathematik, 2012).
Fleisch Ruth	Diploma thesis <i>Ordnungsbedingungen für Splitting-Verfahren bei Anwendung auf Differentialgleichungen mit drei Anteilen</i> (Diplomstudium Mathematik, 2010).
Förg-Rob Philipp	Diploma thesis <i>Approximation unter Betrachtung der Splineinterpolation — Einbindung des Themas in den Schulunterricht</i> (Lehramtsstudium Mathematik, 2016).
Graml Simone	Diploma thesis <i>Numerik in der Schule – Nichtlineare Gleichungen</i> (Lehramtsstudium Mathematik, 2008).
Juen Markus	Diploma thesis <i>Zahlen im Wandel – Die Entwicklung des Zahlbegriffs in der Schullaufbahn von der Volksschule bis zur Matura</i> (Lehramtsstudium Mathematik, 2017).
Kassebacher Thomas	Doctoral thesis <i>Splitting methods for nonlinear Schrödinger equations</i> (2015).
Luschin Theresa	Diploma thesis <i>Regressionsanalyse – Ein theoretischer sowie anwendungsbezogener Zugang für den Schulunterricht</i> (Lehramtsstudium Mathematik, 2015).
Macht Magdalena	Diploma thesis <i>Die Notwendigkeit zur Approximation und deren Umsetzung im Schulunterricht des 21. Jahrhunderts</i> (Lehramtsstudium Mathematik, 2018).
Mayr Julia	Diploma thesis <i>Grenzwerte von Funktionen – ein Vergleich der Lehrpläne von Österreich und Südtirol</i> (Lehramtsstudium Mathematik, 2017).

Neuhauser Christof	Doctoral thesis <i>Space and time integration of nonlinear Schrödinger equations</i> (2010).
Pali Marie-Christine	Master thesis <i>Introductory concepts in fluid dynamics with applications to geophysics</i> (Masterstudium Mathematik, 2017).
Pohler Mirjam	Diploma thesis <i>Die Welt der Grenzwerte und ihre Einbindung in den Mathematikunterricht</i> (Lehramtsstudium Mathematik, 2015).
Rauchegger Sabrina	Diploma thesis <i>Einsatz neuer Medien im Mathematikunterricht</i> (Lehramtsstudium Mathematik, 2018).
Schretter Barbara	Master thesis <i>Operator splitting and finite element methods for the nonlinear Westervelt equation</i> (Masterstudium Mathematik, 2017).
Stofner Maria	Diploma thesis <i>Berge sind keine Kegel – Fraktale Geometrie im Mathematikunterricht</i> (Lehramtsstudium Mathematik, 2015).
Traxl Johannes	Diploma thesis <i>Implementierung von Spektralverfahren zur räumlichen Diskretisierung von Schrödingergleichungen mittels Python</i> (Diplomstudium Mathematik, 2011).

Publications and other contributions

Publications

1. A. Ostermann, M. Thalhammer,
Non-smooth data error estimates for linearly implicit Runge-Kutta methods.
IMA J. Numer. Anal. 20 (2000) 167–184.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper01.pdf>
2. C. González, A. Ostermann, C. Palencia, M. Thalhammer,
Backward Euler discretization of fully nonlinear parabolic problems.
Math. Comp. 71 (2001) 125–145.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper02.pdf>
3. A. Ostermann, M. Thalhammer,
Convergence of Runge-Kutta methods for nonlinear parabolic equations.
Applied Numerical Math. 42 (2002) 367–380.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper03.pdf>
4. A. Ostermann, M. Thalhammer, G. Kirlinger,
Stability of linear multistep methods and applications to nonlinear parabolic problems.
Applied Numerical Math. 48 (2004) 389–407.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper04.pdf>
5. M. Thalhammer,
On the convergence behaviour of variable stepsize multistep methods for singularly perturbed problems.
BIT Numer. Math. 44 (2004) 343–361.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper05.pdf>
6. C. González, A. Ostermann, M. Thalhammer,
A second-order Magnus integrator for nonautonomous parabolic problems.
J. Comp. Appl. Math. 189 (2006) 142–156.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper06.pdf>
7. C. González, M. Thalhammer,
A second-order Magnus type integrator for quasilinear parabolic problems.
Math. Comp. S 0025-5718(06)01883-7.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper07.pdf>
8. A. Ostermann, M. Thalhammer, W. Wright,
A class of explicit exponential general linear methods.
BIT Numer. Math. 46 (2006) 409–431.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper08.pdf>
9. M. Thalhammer,
A fourth-order commutator-free exponential integrator for non-autonomous differential equations.
SIAM J. Numer. Anal. 44/2 (2006) 851–864.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper09.pdf>
10. M. Thalhammer,
High-order exponential operator splitting methods for time-dependent Schrödinger equations.
SIAM J. Numer. Anal. 46/4 (2008) 2022–2038.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper10.pdf>

11. M. Caliari, Ch. Neuhauser, M. Thalhammer,
High-order time-splitting Hermite and Fourier spectral methods for the Gross–Pitaevskii equation.
J. Comput. Phys. 228 (2009) 822–832.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper11.pdf>
12. M. Caliari, A. Ostermann, S. Rainer, M. Thalhammer,
A minimisation approach for computing the ground state of Gross–Pitaevskii systems.
J. Comput. Phys. 228 (2009) 349–360.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper12.pdf>
13. Ch. Neuhauser, M. Thalhammer,
On the convergence of splitting methods for linear evolutionary Schrödinger equations involving an unbounded potential.
BIT Numer. Math. 49 (2009) 199–215.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper13.pdf>
14. S. Descombes, M. Thalhammer,
An exact local error representation of exponential operator splitting methods for evolutionary problems and applications to linear Schrödinger equations in the semi-classical regime.
BIT Numer. Math. 50 (2010) 729–749.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper14.pdf>
15. E. Emmrich, M. Thalhammer,
Stiffly accurate Runge–Kutta methods for nonlinear evolution problems governed by a monotone operator.
Math. Comp. 79 (2010) 785–806.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper15.pdf>
16. E. Emmrich, M. Thalhammer,
Convergence of a time discretisation for doubly nonlinear evolution equations of second order.
Found. Comput. Math. 10 (2010) 171–190.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper16.pdf>
17. E. Emmrich, M. Thalhammer,
Doubly nonlinear evolution equations of second order: Existence and fully discrete approximation.
J. Diff. Equ. 251 (2011) 82–118.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper17.pdf>
18. E. Emmrich, M. Thalhammer,
A class of integro-differential equations incorporating nonlinear and nonlocal damping with applications in nonlinear elastodynamics: Existence via time discretization.
Nonlinearity 24 (2011) 2523–2546.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper18.pdf>
19. W. Auzinger, O. Koch, M. Thalhammer,
Defect-based local error estimators for splitting methods, with application to Schrödinger equations. Part I. The linear case.
J. Comput. Appl. Math. 236 (2012) 2643–2659.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper19.pdf>
20. M. Thalhammer, J. Abhau,
A numerical study of adaptive space and time discretisations for Gross–Pitaevskii equations.
J. Comput. Phys. 231 (2012) 6665–6681.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper20.pdf>

21. M. Thalhammer,
Convergence analysis of high-order time-splitting pseudo-spectral methods for nonlinear Schrödinger equations.
SIAM J. Numer. Anal. 50/6 (2012) 3231–3258.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper21.pdf>
22. S. Descombes, M. Thalhammer,
The Lie–Trotter splitting for nonlinear evolutionary problems with critical parameters: A compact local error representation and application to nonlinear Schrödinger equations in the semiclassical regime.
IMA J. Numer. Anal. 33/2 (2013) 722–745.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper22.pdf>
23. O. Koch, Ch. Neuhauser, M. Thalhammer,
Embedded exponential operator splitting methods for the time integration of nonlinear evolution equations.
Appl. Numer. Math. 63 (2013) 14–24.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper23.pdf>
24. O. Koch, Ch. Neuhauser, M. Thalhammer,
Error analysis of high-order splitting methods for nonlinear evolutionary Schrödinger equations and application to the MCTDHF equations in electron dynamics.
M2AN 47/5 (2013) 1265–1286.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper24.pdf>
25. W. Auzinger, O. Koch, M. Thalhammer,
Defect-based local error estimators for splitting methods, with application to Schrödinger equations. Part II. Higher-order methods for linear problems.
J. Comput. Appl. Math. 255 (2014) 384–403.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper25.pdf>
26. J. Gwinner, M. Thalhammer,
Full discretisations for nonlinear evolutionary inequalities based on stiffly accurate Runge–Kutta and hp-finite element methods.
Found. Comput. Math. 14 (2014) 913–949.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper26.pdf>
27. H. Hofstätter, O. Koch, M. Thalhammer,
Convergence analysis of high-order time-splitting pseudo-spectral methods for rotational Gross–Pitaevskii equations.
Numer. Math. 127/2 (2014) 315–364.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper27.pdf>
28. B. Kaltenbacher, V. Nikolić, M. Thalhammer,
Efficient time integration methods based on operator splitting and application to the Westervelt equation.
IMA J. Numer. Anal. 35/3 (2015) 1092–1124.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper28.pdf>
29. W. Auzinger, H. Hofstätter, O. Koch, M. Thalhammer,
Defect-based local error estimators for splitting methods, with application to Schrödinger equations. Part III. The nonlinear case.
J. Comput. Appl. Math. 273 (2015) 182–204.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper29.pdf>

30. W. Auzinger, O. Koch, M. Thalhammer,
Defect-based local error estimators for high-order splitting methods involving three linear operators.
Numer. Algor. 70/1 (2015) 61–91.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper30.pdf>
31. E. Emmrich, D. Šiška, M. Thalhammer,
On a full discretisation for nonlinear second-order evolution equations with monotone damping: construction, convergence, and error estimates.
Found. Comput. Math. 15 (2015) 1653–1701.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper31.pdf>
32. C. González, M. Thalhammer,
Higher-order exponential integrators for quasi-linear parabolic problems. Part I. Stability.
SIAM J. Numer. Anal. 53/2 (2015) 701–719.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper32.pdf>
33. Ph. Chartier, F. Méhats, M. Thalhammer, Y. Zhang,
Improved error estimates for splitting methods applied to highly-oscillatory nonlinear Schrödinger equations.
Math. Comp. 85/302 (2016) 2863–2885.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper33.pdf>
34. W. Auzinger, Th. Kassebacher, O. Koch, M. Thalhammer,
Adaptive splitting methods for nonlinear Schrödinger equations in the semiclassical regime.
Numer Algor. 72 (2016) 1–35.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper34.pdf>
35. C. González, M. Thalhammer,
Higher-order exponential integrators for quasi-linear parabolic problems. Part II. Convergence.
SIAM J. Numer. Anal. 54/5 (2016) 2868–2888.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper35.pdf>
36. W. Auzinger, Th. Kassebacher, O. Koch, M. Thalhammer,
Convergence of a Strang splitting finite element discretization for the Schrödinger–Poisson equation.
ESAIM: M2AN 51/4 (2017) 1245–1278.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper36.pdf>
37. S. Blanes, F. Casas, M. Thalhammer,
Convergence analysis of high-order commutator-free quasi-Magnus exponential integrators for nonautonomous linear evolution equations of parabolic type.
IMA J. Numer. Anal. 38/2 (2018) 743–778 (published May 2017).
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper37.pdf>
38. Ph. Chartier, F. Méhats, M. Thalhammer, Y. Zhang,
Convergence of multi-revolution composition time-splitting methods for highly oscillatory differential equations of Schrödinger type.
ESAIM: M2AN 51 (2017) 1859–1882.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper38.pdf>
39. S. Blanes, F. Casas, M. Thalhammer,
High-order commutator-free quasi-Magnus exponential integrators for non-autonomous linear evolution equations.
Comp. Phys. Commun. 220 (2017) 243–262.
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper39.pdf>

40. B. Kaltenbacher, M. Thalhammer, *Fundamental models in nonlinear acoustics. Part I. Analytical comparison*. Accepted for publication in M3AS (2018).
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper40Preliminary.pdf>
41. W. Auzinger, H. Hofstätter, O. Koch, M. Quell, M. Thalhammer, *A posteriori error estimation for Magnus-type integrators*. Accepted for publication in ESAIM: M2AN (2018).
<http://techmath.uibk.ac.at/mecht/MyHomepage/Publications/MyPaper41Preliminary.pdf>

Proceedings

1. A. Ostermann, M. Thalhammer, *Positivity of exponential multistep methods*. In: A. Bermudez et al., Numerical Mathematics and Advanced Applications. ENUMATH 2005. Springer, Berlin, 2006.
2. W. Fellin, M. Mergili, A. Ostermann, K. Schratz, M. Thalhammer, *An open source model for the simulation of granular flows: First results with GRASS GIS and needs for further investigations*. Academic Proceedings of the 2008 Free and Open Source Software for Geospatial (FOSS4G) Conference, Sept. 29 – Oct. 3, Cape Town, South Africa, 231–238.
3. W. Auzinger, O. Koch, M. Thalhammer, *Representation of the local error for higher-order exponential splitting schemes involving two or three sub-operators*. AIP Conf. Proc. 1648, 150003 (2015), <http://dx.doi.org/10.1063/1.4912433>.

Submitted manuscripts

1. E. Hausenblas, T. Randrianasolo, M. Thalhammer, *Theoretical study and numerical simulation of pattern formation in the deterministic and stochastic Gray–Scott equations*. Submitted for publication (2018).

Diploma, doctoral, and habilitation thesis

1. *Die numerische Behandlung freier Randwertprobleme*. Diploma thesis, 1997. Supervisor: A. Ostermann.
2. *Runge-Kutta Time Discretization of Fully Nonlinear Parabolic Problems*. Doctoral thesis, 2000. Supervisor: A. Ostermann.
3. *Time Integration of Differential Equations*. Habilitation thesis, 2006.

Lecture notes

Time-splitting spectral methods for nonlinear Schrödinger equations (2009, revised and amended versions 2010, 2011, 2013).

Numerische Mathematik I (2011).

Numerische Mathematik II (2012).

Numerische Verfahren für Differentialgleichungen I – Strukturerhaltende Algorithmen für gewöhnliche Differentialgleichungen (2012).

Mathematische Modellierung mit partiellen Differentialgleichungen (2014, revised version 2015).
Mathematische Grundlagen der Quantenmechanik, Spektraltheorie und Anwendungen in der Quantenmechanik (2015, revised versions 2017, 2018).
Stochastische partielle Differentialgleichungen I-II (2015, 2016, revised versions 2017, 2018).
Numerical methods for models in atmospheric sciences (2016, revised versions 2017, 2018).
Operatortheorie (2016, revised versions 2017, 2018).
Partielle Differentialgleichungen (2018).

Research projects

Former research projects

1. *Diskretisierung partieller Differentialgleichungen.* Charlotte–Bühler–Programm des Fonds zur Förderung der wissenschaftlichen Forschung (FWF). Period: March 1 – September 30, 2005.
2. *Analysis von Zeitdiskretisierungen nichtlinearer parabolischer Gleichungen.* Deutsche Forschungsgemeinschaft (DFG). Travel grant, joint project with E. Emmrich (Technische Universität Berlin). Period: October 1 – December 31, 2008.
3. *Diskretisierung nichtlinearer Evolutionsgleichungen.* Deutsche Forschungsgemeinschaft (DFG). Travel grant, joint project with E. Emmrich (Technische Universität Berlin). Period: May 1 – July 31, 2009.
4. *Analysis von Diskretisierungen nichtlinearer Evolutionsgleichungen zweiter Ordnung.* Deutsche Forschungsgemeinschaft (DFG). Travel grant, joint project with E. Emmrich (Technische Universität Berlin). Period: October 1, 2009 – March 31, 2010.
5. *Numerical methods for nonlinear Schrödinger equations.* Fonds zur Förderung der wissenschaftlichen Forschung (FWF). Period: October 1, 2009 – September 30, 2012 (prolonged to September 30, 2014).
6. *LODIQUAS – Modeling and Numerical Simulation of Low Dimensional Quantum Systems.* Agence nationale de la recherche (ANR), Blanc International II Programme. Project coordinators: N. Mauser (Austria), F. Castella (France). Austrian investigators: N. Mauser, E. Gornik, M. Thalhammer. Period: April 1, 2012 – March 30, 2015 (prolongation to December 2015).
7. *Effiziente Zeitintegrationsverfahren für nichtlineare Evolutionsgleichungen.* Tiroler Wissenschaftsfonds (TWF). Employee Barbara Schretter. Period: January 1, 2017 – June 30, 2017.

Participation in other research projects

1. *The long-time behaviour of discretizations of parabolic evolution equations.* Acciones Integradas (Austria – Spain 1998/99). Project of A. Ostermann (Universität Innsbruck) and C. Palencia (Universidad de Valladolid). Period: January 1, 1998 – December 31, 1999.
2. *Zeitdiskretisierung nichtlinearer parabolischer Evolutionsgleichungen.* Fonds zur Förderung der wissenschaftlichen Forschung. Project of A. Ostermann (Universität Innsbruck). Period: December 1, 1999 – November 20, 2001.
3. *Numerical analysis of deterministic systems through stochastic techniques.* Acciones Integradas (Austria – Spain 2002/03). Project of A. Ostermann (Universität Innsbruck) and C. Palencia (Universidad de Valladolid). Period: January 1, 2002 – December 31, 2003.
4. *Innovative concepts for nonlinear analysis of lightweight structures.* TransIT, Intales. Project of M. Oberguggenberger and A. Ostermann (Universität Innsbruck). Period: 2006 – 2007 (18 months).
5. *Advanced concept for structure analysis of large lightweight structures.* FFG, Intales. Project of M. Oberguggenberger and A. Ostermann (Universität Innsbruck). Period: 2008 – 2009 (18 months).

Other former projects

1. *Sommerpraktikum Mathe-Cool!* Project funded by FFG (Talente – Praktika für Schülerinnen und Schüler). Joint application with Wolfgang Förg–Rob, Daniela Schiefeneder. Project collaborators Hannah Gschwentner, Bernard Putzer. Period: July 9 – August 3, 2018.

Conference contributions

Organisation of conferences

1. Assistance in the organisation of the meeting *Workshop on Exponential Integrators 2004* (Innsbruck, Austria) organised by A. Ostermann.
2. Assistance in the organisation of the meeting *Workshop on Computational Life Sciences 2005* (Innsbruck, Austria) organised by A. Ostermann.
3. Assistance in the organisation of the meeting *Innovative Integrators for Differential and Delay Equations 2006* (Innsbruck, Austria) organised by A. Ostermann.
4. Assistance in the organisation of the meeting *Time Integration of Evolution Equations 2007* (Innsbruck, Austria) organised by A. Ostermann.
5. Assistance in the organisation of the meeting *Splitting Methods in Time Integration 2008* (Innsbruck, Austria) organised by A. Ostermann.
6. Assistance in the organisation of the meeting *Austrian Numerical Analysis Day 2009* (Innsbruck, Austria) organised by A. Ostermann.
7. Workshop *Two Days on Splitting Methods for Evolution Equations 2010* (Innsbruck, Austria), funded by the *Frankreich-Schwerpunkt – Le Pôle interdisciplinaire d'études françaises* of the University of Innsbruck.
8. Organisation of conference *Austrian Numerical Analysis Day 2018* (Klagenfurt, Austria) with Barbara Kaltenbacher, Elena Resmerita, Anita Wachter (<http://anaday2018.aau.at>).

Organisation of special sessions and minisymposia

1. SciCADE 2007 (Saint Malo, France), Minisymposium on *Nonlinear evolution equations*.
2. ICIAM 2007 (Zürich, Switzerland), Minisymposium on *Time integration of evolution equations*, organised together with A. Ostermann.
3. 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications 2012 (Orlando, Florida, USA), Special session on *Advances in the numerical solution of nonlinear evolution equations*.
4. IFIP TC7/2013 System Modelling and Optimization (Klagenfurt, Austria), Minisymposium on *Nonsmooth and unilateral problems – modelling, analysis and optimisation methods*, organised together with J. Gwinner.
5. 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications 2014 (Madrid, Spain), Special session on *Advances in the numerical solution of nonlinear evolution equations*.
6. 9th International Conference on Computational Physics 2015 (Singapore), Minisymposium on *Numerical simulation of quantum and kinetic problems*, organised together with Weizhu Bao and Mohammed Lemou.
7. SciCADE 2015 (Potsdam), Minisymposium on *Stochastic partial differential equations: Analytical and numerical aspects*, organised together with Erika Hausenblas and Sylvie Roelly.
8. 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications 2016 (Orlando, Florida, USA), Special session on *Advances in the numerical solution of nonlinear evolution equations*, organised together with Winfried Auzinger.

Organisation of working groups

Wolfgang Pauli Institute (Vienna, June 22–26, 2015), Working group on *Efficient numerics for nonlinear Schrödinger equations*, organised together with Norbert Mauser.

Wolfgang Pauli Institute (Vienna, March 7–10, 2017), Working group on *Efficient numerical methods for quantum systems*, organised together with Norbert Mauser.

Wolfgang Pauli Institute (Vienna, February 6–9, 2018), Working group on *Novel approaches for adaptive time integration and application to Gross-Pitaevskii equations*, organised together with Norbert Mauser.

Plenary talk

International conference on scientific computation and differential equations (SciCADE) 2011 (Toronto, Canada), *Favourable space and time discretisations for nonlinear Schrödinger equations*.

Communications at conferences

1. ICM 1998 (Berlin, Germany), *Non-smooth data error estimates for linearly-implicit Runge-Kutta methods*.
2. 18th Biennial Conference on Numerical Analysis 1999 (Dundee, Scotland, UK), *Non-smooth data error estimates for linearly-implicit Runge-Kutta methods and applications to long-term behaviour*.
3. Euroconference on Numerical Methods for Evolution Partial Differential Equations 2000 (Anogia, Crete), *Runge-Kutta time discretization of nonlinear parabolic problems*.
4. 19th Biennial Conference on Numerical Analysis 2001 (Dundee, Scotland, UK), *Multistep methods for fully nonlinear parabolic equations - how do they behave?*
5. SciCADE 2001 (Vancouver, Canada), *Convergence and long-term behaviour of time discretizations for fully nonlinear parabolic problems*.
6. 15. ÖMG-Kongress & Jahrestagung der Deutschen Mathematikervereinigung 2001 (Vienna, Austria), *The numerics of nonlinear parabolic problems*.
7. Conference on Scientific Computation 2002 (Geneva, Switzerland), *Some qualitative aspects of nonlinear evolution equations under time discretization*.
8. Workshop on Innovative Time Integration for PDEs 2002 (Amsterdam, The Netherlands), *Stability of linear multistep methods and applications to nonlinear parabolic problems*.
9. SciCADE 2003 (Trondheim, Norway), *On the convergence behaviour of variable stepsize multistep methods for singularly perturbed problems*.
10. 10th Seminar NUMDIFF on Numerical Solution of Differential and Differential-Algebraic Equations 2003 (Halle, Germany), *Convergence of variable stepsize linear multistep methods for singular perturbation problems*.
11. 8. Österreichisches Mathematikertreffen & Nachbarschaftstagung in Kooperation mit SIMAI und UMI 2003 (Bolzano, Italy), *Variable stepsize linear multistep discretizations of singular perturbation problems*.
12. ICCAM 2004 (Leuven, Belgium), *A second-order Magnus integrator for non-autonomous parabolic problems*.
13. Workshop on Exponential Integrators 2004 (Innsbruck, Austria), *On the convergence behaviour of a second-order Magnus integrator for linear non-autonomous parabolic problems*.
14. MaGIC 2005 (Ustaaset, Norway), *Magnus type integrators for nonlinear parabolic problems*.
15. Austrian Numerical Analysis Day 2005 (Oberurgl, Austria), *Exponential and Magnus integration methods for the time discretisation of evolution equations*.
16. ENUMATH 2005 (Santiago de Compostela, Spain), *A class of explicit exponential general linear methods*.
17. ICDE 2005 (Zürich, Switzerland), *Exponential time integration schemes for semilinear initial-boundary value problems*.
18. Austrian Numerical Analysis Day 2006 (Graz, Austria), *Exponential integrators for parabolic initial-boundary value problems*.
19. Workshop on Innovative Integrators for Differential and Delay Equations 2006 (Innsbruck, Austria), *Exponential integration methods for evolution equations*.
20. SciCADE 2007 (Saint Malo, France), *Time-splitting spectral methods for the Gross-Pitaevskii equation*.
21. 6th International Congress on Industrial and Applied Mathematics (ICIAM) 2007 (Zürich, Switzerland), *High-order splitting methods for linear and nonlinear Schrödinger equations*.
22. Workshop on Time Integration of Evolution Equations 2007 (Innsbruck, Austria), *On the convergence of high-order splitting for linear and nonlinear Schrödinger equations*.

23. MaGIC 2008 (Renon, Bolzano, Italy), *Time-splitting spectral methods for nonlinear Schrödinger equations*.
24. Nonlinear Degenerate Quantum Gases (NLQUGAS) 2008 (Toledo, Spain), *On the convergence of the Strang time-splitting Hermite spectral method for nonlinear Schrödinger equations*.
25. Austrian Numerical Analysis Day 2008 (Linz, Austria), *On the error behaviour of exponential operator splitting methods for nonlinear Schrödinger equations*.
26. 3rd Workshop on Stability and Discretization Issues in Differential Equations (SDIDE) 2008 (Vienna, Austria), *On the stability and convergence of exponential operator splitting methods for evolutionary Schrödinger equations*.
27. Workshop on Splitting Methods in Time Integration 2008 (Innsbruck, Austria), *Exponential operator splitting methods for evolutionary nonlinear Schrödinger equations*.
28. Vienna Conference on Mathematical Modelling (MATHMOD) 2009 (Vienna, Austria), *Advanced integration methods for nonlinear Schrödinger equations*.
29. Conference on Scientific Computing 2009 (Geneva, Switzerland), *Local error expansions for high-order exponential operator splitting methods*. Talk within the minisymposium on *Splitting methods for stiff and nonstiff problems* organised by S. Descombes and M. Massot.
30. International Conference on Spectral and High Order Methods (ICOSAHOM) 2009 (Trondheim, Norway), *High-order time-splitting spectral methods for nonlinear Schrödinger equations*. Talk within the minisymposium on *High-order methods for linear and nonlinear wave equations* organised by W. Bao, J. Shen, and L.-L. Wang.
31. Mathematical Models of Quantum fluids – Geometrical, Analytical and Computational Aspects 2009 (Verona, Italy), *High-order time-splitting spectral methods for Gross–Pitaevskii systems*.
32. Workshop Two Days on Splitting Methods for Evolution Equations 2010 (Innsbruck, Austria), *Exponential operator splitting methods for the efficient time integration of nonlinear evolution equations*.
33. Austrian Numerical Analysis Day 2010 (Salzburg, Austria), *Embedded split-step formulae for the time integration of nonlinear evolution equations*.
34. A Symposium on Splitting Methods for Differential Equations 2010 (Castellón, Spain), *Are exponential operator splitting methods favourable for the time integration of evolutionary problems involving critical parameters?*
35. 8th International Conference of Numerical Analysis and Applied Mathematics (ICNAAM) 2010 (Rhodes, Greece), *On the error behaviour of splitting methods for a class of nonlinear Schrödinger equations*. Talk within the *Third Symposium on Recent Trends in the Numerical Solution of Differential Equations* organised by L. Brugnano and E. Weinmüller.
36. Workshop on Numerical Methods for stiff problems in Hamiltonian systems and kinetic equations 2011 (Saint Malo, France), *Error behaviour of splitting methods for nonlinear Schrödinger equations with critical parameters*.
37. Austrian Numerical Analysis Day 2011 (Klagenfurt, Austria), *Reliable time discretisations of Schrödinger equations with critical parameters*.
38. ICIAM 2011 (Vancouver, Canada), *High-order exponential operator splitting methods for nonlinear Schrödinger equations*. Talk within Minisymposium *Modeling, Analysis and Simulation for Degenerate Quantum Gases* organised by W. Bao, I.-L. Chern, and Y. Zhang.
39. OEMG & CSASC 2011 (Krems, Austria), *Adaptive space and time discretisations for nonlinear Schrödinger equations*.
40. Program on Multiscale Modeling, Simulation, Analysis and Applications, Workshop III, January 2012 (Singapore), *Adaptive time integration methods for Gross–Pitaevskii equations*.

41. GAMM 2012 (Darmstadt, Germany), *Adaptive exponential operator splitting methods for nonlinear evolution equations*.
42. Austrian Numerical Analysis Day 2012 (Vienna, Austria), *Stiffly accurate Runge–Kutta methods for nonlinear evolutionary equations and inequalities*.
43. The 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications 2012 (Orlando, Florida, USA), *Favourable discretisations for low-dimensional nonlinear Schrödinger equations*.
44. Workshop on Low dimensional Quantum Systems 2012 (Vienna, Austria), *Adaptive time integration methods for Gross–Pitaevskii equations*.
45. Workshop on Spectral Theory and Differential Operators 2012 (Graz, Austria), *Convergence analysis of high-order time-splitting pseudo-spectral methods for a class of nonlinear Schrödinger equations*.
46. 13th Seminar NUMDIFF on Numerical Solution of Differential and Differential-Algebraic Equations 2012 (Halle, Germany), *Adaptive space and time discretisations for Gross–Pitaevskii equations*.
47. Workshop on Confined Quantum Systems: Modeling, Analysis and Computation 2013 (Vienna, Austria), *Adaptive integration methods for time-dependent Gross–Pitaevskii equations: Theoretical and practical aspects*.
48. Workshop on Quantized vortices in superfluidity and superconductivity 2013 (Vienna, Austria), *Convergence analysis of high-order time-splitting pseudo-spectral methods for rotational Gross–Pitaevskii equations*.
49. ENUMATH 2013 (Lausanne, Switzerland), *Multi-revolution composition and operator-splitting pseudo-spectral methods for time-dependent Schrödinger equations*. Talk within Minisymposium *Asymptotic preserving schemes for highly oscillatory PDEs* organised by Ph. Chartier and M. Lemou.
50. IFIP 2013 (Klagenfurt, Austria), *Discretisations for nonlinear evolutionary equalities and inequalities based on stiffly accurate Runge–Kutta methods*. Talk within Minisymposium *Non-smooth and Unilateral Problems – Modelling, Analysis and Optimisation Methods* organised together with J. Gwinner.
51. SCICADE 2013 (Valladolid, Spain), *Multi-revolution composition and operator-splitting pseudo-spectral methods for time-dependent Schrödinger equations*. Talk within Minisymposium *Splitting Methods* organised by F. Casas.
52. Workshop on Mathematical and numerical analysis of electronic structure models 2014 (Berlin, Germany), *Error analysis of operator splitting methods for nonlinear Schrödinger equations and application to the MCTDHF equations in electron dynamics*.
53. The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications 2014 (Madrid, Spain), *Efficient time integration methods based on operator splitting and application to the Westervelt equation*. Talk within Special Session 108 on Mathematics of Nonlinear Acoustics organised by B. Kaltenbacher. *Convergence analysis of high-order commutator-free exponential integrators for non-autonomous linear evolution equations*. Talk within Special Session 63 on Advanced High Order Geometric Numerical Integration Methods for Differential Equations organised by S. Blanes and F. Casas.
54. LODIQUAS Seminar 2014 (St. Malo, France), *Efficient time integration methods based on operator splitting and application to the Westervelt equation*.
55. LODIQUAS Seminar 2015 (Dinard, France), *Convergence analysis of multi-revolution composition time-splitting spectral methods for highly oscillatory evolution equations*.
56. Stability and Discretization Issues in Differential Equations (SDIDE) 2016 (Trieste, Italy), *Design of commutator-free Magnus integrators for non-autonomous linear evolution equations*.

57. New Challenges in Mathematical Modelling and Numerical Simulation of Superfluids 2016 (CIRM, Marseille, France), *High-order commutator-free Magnus integrators for non-autonomous linear evolution equations*.
58. International Conference on Hyperbolic Problems – Theory, Numerics, Applications (HYP) 2016 (Aachen, Germany), *Time integration based on operator splitting and application to models from nonlinear acoustics*.
59. Workshop on Nonlinear Stochastic Evolution Equations: Analysis and Numerics 2016 (Berlin, Germany), *Commutator-free Magnus integrators and their areas of application*.
60. Workshop on Recent Contributions of Women to Partial Differential Equations 2016 (Vienna, Austria), *Commutator-free Magnus integrators combined with operator splitting methods and their areas of application*.
61. Workshop on Modern Numerical Methods for Quantum Mechanics 2017 (Polish Academy of Sciences, Warsaw, Poland), *Commutator-free quasi-Magnus exponential integrators combined with operator splitting methods and their areas of application*.
62. Workshop on Numerical methods for PDEs and their applications 2017 (Institut Mittag-Leffler, Djursholm, Stockholm, Sweden), *Favourable time integration methods for non-autonomous evolution equations*.
63. Foundations of Computational Mathematics 2017 (Barcelona, Spain), *Two approaches for the design of adaptive time-splitting methods*. Talk within workshop on Geometric Integration and Computational Mechanics organised by Fernando Casas, Elena Celledoni, David Martin de Diego.
64. Workshop on Advances in Mathematical Modelling and Numerical Simulation of Superfluids 2017 (Rouen, France), *Three approaches for the design of adaptive time-splitting methods*.
65. SciCADE 2017 (Bath, United Kingdom), *Favourable time integration methods for non-autonomous evolution equations*. Talk within invited minisymposium on Numerical integration of non-autonomous dynamical systems organised by Sergio Blanes.
66. 89th GAMM Annual Meeting 2018 (Munich, Germany), *Fundamental nonlinear wave equations arising in nonlinear acoustics: analytical and numerical aspects*.
67. Nonlinear and Nonlocal Evolution Equations and Stochastic Methods 2018 (Stralsund, Germany), *Nonlinear damped wave equations arising in high-intensity ultrasonics: analytical and numerical aspects*.
68. Modern Numerical Methods for Quantum Mechanics II, 2018 (Gdańsk, Poland), *Convergence analysis of commutator-free quasi-Magnus exponential integrators for non-autonomous linear Schrödinger equations*.

Conferences and courses (without presentation)

1. Summer School on Numerical Methods for ODEs 2000 (Dobbiaco, Italy)
2. 2nd EuroConference Mathematical Foundations of Geomechanics 2001 (Innsbruck)
3. Summer School in Geometric Integration 2002 (Fevik, Norway)
4. Summer School on Numerical Methods for Evolution Equations 2004 (Dobbiaco, Italy)
5. Summer School on Life Sciences 2005 (Dobbiaco, Italy)
6. SIMNET Kompaktkurs Lineare Gleichungssysteme und Hierarchische Matrizen 2006 (Graz, Austria)
7. Summer School on Delay Differential Equations and Applications 2006 (Dobbiaco, Italy)
8. Summer School on Molecular Dynamics and Time Integration of PDEs 2008 (Dobbiaco, Italy)
9. Dolomites Research Week on Approximation (DRWA) 2008 (Alba di Canazei, Trento, Italy)
10. Summer School on Discontinuous Galerkin Methods: Theory and Applications 2010 (Dobbiaco, Italy)
11. Spring School on Analytical and Numerical Aspects of Evolution Equations 2011 (Essen, Germany)
12. Advances in the Numerical Solution of Constrained Differential Equations (AMP) 2011 (Vancouver, Canada)
13. Spring School on Analytical and Numerical Aspects of Evolution Equations 2012 (Bielefeld, Germany)
14. Spring School on Analytical and Numerical Aspects of Evolution Equations 2013 (Berlin, Germany)
15. Austrian Numerical Analysis Day 2013 (Graz, Austria)
16. Recent Trends in Differential Equations: Analysis and Discretisation Methods 2013 (Berlin, Germany)
17. Stochastic Partial Differential Equations and Applications IX 2014 (Levico, Italy)
18. Austrian Numerical Analysis Day 2014 (Vienna, Austria)
19. 12th European Finite Element Fair 2014 (Vienna, Austria)
20. Advances in Nonlinear PDEs: Analysis, Numerics, Stochastics, Applications 2014 (Vienna, Austria)
21. International Conference on Computational Methods in Applied Mathematics 2014 (Strobl, Austria)
22. Austrian Numerical Analysis Day 2015 (Linz, Austria)
23. Stochastic Partial Differential Equations and Applications X 2016 (Levico, Italy)
24. Austrian Numerical Analysis Day 2018 (Klagenfurt, Austria)
25. Stochastic Partial Differential Equations and Applications 2018 (CIRM, Marseille, France)

Research stays and colloquia

Research stays

May 1998	Two weeks with César Palencia, Universidad de Valladolid. Supported by Acciones Integradas.
October 1999	Two weeks with César Palencia, Universidad de Valladolid. Supported by Acciones Integradas.
February 2000	Two weeks with Alexander Ostermann, Université de Genève. Supported by Schweizer Nationalfonds.
September 2002	One week with Gabriela Schranz–Kirlinger, Technische Universität Wien.
December 2002	One week with César Palencia, Universidad de Valladolid. Supported by Acciones Integradas.
April 2003	One week with Gabriela Schranz–Kirlinger, Technische Universität Wien.
July 2003	Three days with M. Hochbruck, Universität Düsseldorf.
November 2003	One week with César Palencia, Universidad de Valladolid. Supported by Acciones Integradas.
June 2004	One week with César Palencia, Universidad de Valladolid.
April 2005	One week with César Palencia and Cesáreo González, Universidad de Valladolid.
March 2006	One week with Volker Grimm, Universität Düsseldorf.
November 2006	One week with Cesáreo González, Universidad de Valladolid.
January 2007	Three days with Etienne Emmrich, Technische Universität Berlin.
May 2008	One week with Marco Caliari, Università di Verona.
July 2008	One week with Etienne Emmrich, Technische Universität Berlin.
December 2008	One week with Etienne Emmrich, Technische Universität Berlin.
April 2009	Three days with Etienne Emmrich, Technische Universität Berlin.
July 2009	One week with Etienne Emmrich, Technische Universität Berlin.
January 2010	Three days with Othmar Koch, Technische Universität Wien.
February 2010	One week with Etienne Emmrich, Universität Bielefeld.
August 2010	One week with Etienne Emmrich, Universität Bielefeld.
October 2010	One week with Stéphane Descombes, Université de Nice.
January 2011	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
February 2011	One week with Etienne Emmrich, Universität Bielefeld.
May 2011	Four days with Lorenzo Pareschi, Università di Ferrara.
December 2012	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
May 2012	One week with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
October 2012	One week with Philippe Chartier and Florian Mehats, INRIA Rennes.
December 2012	One week with Etienne Emmrich, Technische Universität Berlin.
February 2013	Three days with Barbara Kaltenbacher, Universität Klagenfurt.
March 2013	Four days with Etienne Emmrich, Technische Universität Berlin.
March 2013	Three days with Lorenzo Pareschi, Università di Ferrara.

November 2013	Two days with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
May 2014	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
November 2014	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien.
February 2015	Eight days with Etienne Emmrich, Technische Universität Berlin.
June 2015	Twelve days with Cesáreo González, Universidad de Valladolid.
January 2016	Three days with Barbara Kaltenbacher, Universität Klagenfurt.
March 2016	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien, Universität Wien.
August 2016	Three days with Erika Hausenblas, Montanuniversität Leoben.
September 2016	Four days with Winfried Auzinger and Othmar Koch, Technische Universität Wien, Universität Wien.
February 2017	Three days with Barbara Kaltenbacher, Universität Klagenfurt.
August 2017	Two days with Barbara Kaltenbacher, Universität Klagenfurt.
January 2018	Three days with Winfried Auzinger and Othmar Koch, Technische Universität Wien, Universität Wien.

Colloquia

1. Universidad de Valladolid (October 1999), *Time discretization of nonlinear parabolic problems.*
2. Université de Genève (February 2000), *On the convergence of Rosenbrock and W-methods for semilinear parabolic problems.*
3. Universität Wien (September 2002), *Zur zeitlichen Diskretisierung nichtlinearer Evolutionsgleichungen.*
4. Universidad de Valladolid (December 2002), *Stability results for variable stepsize linear multistep methods and applications to nonlinear evolution equations.*
5. Universität Wien (April 2003), *Stabilitätsresultate für Mehrschrittverfahren mit Anwendungen auf nichtlineare Evolutionsgleichungen.*
6. Universität Düsseldorf (July 2003), *Zum Langzeitverhalten von Zeitdiskretisierungen für nichtlineare parabolische Gleichungen.*
7. Universidad de Valladolid (November 2003), *On the convergence and stability behaviour of variable stepsize linear multistep methods for singular perturbation problems.*
8. Universidad de Valladolid (June 2004), *Magnus integrators for non-autonomous equations.*
9. Universidad de Valladolid (April 2005), *A second-order Magnus type integrator for non-autonomous semilinear parabolic problems.*
10. Universität Düsseldorf (March 2006), *Explicit exponential integrators unifying Runge-Kutta and multistep methods.*
11. Universidad de Valladolid (November 2006), *Exponential operator splitting for evolutionary Schrödinger equations.*
12. Technische Universität Berlin (January 2007), *On the convergence of exponential operator splitting for time-dependent Schrödinger equations.*
13. University of Cambridge (February 2007), *Exponential operator splitting for time-dependent Schrödinger equations.*
14. Technische Universität Berlin (July 2008), *High-order time-splitting spectral methods for nonlinear Schrödinger equations.*
15. Technische Universität Wien (January 2010), *Advanced space and time discretisations of nonlinear Schrödinger equations. Theoretical and practical aspects.*
16. Universität Bielefeld (February 2010), *Advanced space and time discretisations of nonlinear Schrödinger equations. Theoretical and practical aspects.*
17. Universität Bielefeld (August 2010), *Exponential operator splitting methods for linear evolutionary problems involving critical parameters.*
18. Université de Nice (October 2010), *Are exponential operator splitting methods favourable for the time integration of evolutionary Schrödinger equations?*
19. Norges teknisk-naturvitenskapelige universitet (NTNU) i Trondheim (November 2011), *Adaptive space and time discretisations for nonlinear Schrödinger equations.*
20. Universität der Bundeswehr München (November 2011), *Time integration methods for nonlinear evolution equations.*
21. Technische Universität Berlin (December 2012), *Stiffly accurate Runge-Kutta methods for nonlinear evolutionary equations and inequalities.*
22. Universität Klagenfurt (February 2013), *Adaptive integration methods for time-dependent Gross-Pitaevskii equations: Theoretical and practical aspects.*
23. Humboldt-Universität zu Berlin (February 2015), *Operator splitting methods for nonlinear Schrödinger equations.*
24. Universität Klagenfurt (January 2016), *Efficient time integration methods for highly oscillatory Schrödinger equations.*

25. Universität Wien (March 2016), *Convergence analysis of high-order commutator-free exponential integrators for non-autonomous linear evolution equations.*
26. Montanuniversität Leoben (August 2016), *Favourable time integration methods for non-autonomous linear evolution equations.*
27. Karlsruher Institut für Technologie (February 2017), *Time integration methods for non-autonomous evolution equations.*

Colloquia (Berufungsvortrag, Vorstellungsvortrag)

1. Universität Klagenfurt (April 2011), Berufungsvortrag Angewandte Analysis, *Favourable space and time discretisations for nonlinear Schrödinger equations.*
2. Fakultät für Luft- und Raumfahrttechnik der Universität der Bundeswehr München (Juni 2011), Vorstellungsvortrag Vertretungsprofessur *Numerische Methoden in der Luft- und Raumfahrttechnik (W3)*, *Numerical methods for nonlinear evolution equations.*
3. Fakultät für Mathematik der Universität Bielefeld (Oktober 2012), Berufungsvortrag Mathematik (W2), *High-order time-splitting pseudo-spectral methods for nonlinear Schrödinger equations.*
4. Antrittsvorlesung Leopold–Franzens Universität Innsbruck (December 2016), *Commutator-free Magnus integrators combined with operator splitting methods and their areas of application.*

Colloquia and short presentations (Universität Innsbruck)

1. Matiné, Institut für Mathematik (April 2005), *Exponentielle Integrioren für parabolische Evolutionsgleichungen.*
2. Tag der offenen Tür (November 2005), *Studieren an der Fakultät für Mathematik, Informatik und Physik – Technische Mathematik.*
3. Institut für Astrophysik (December 2005), *Exponentielle Verfahren für Evolutionsgleichungen.*
4. Tag der Mathematik (February 2006), *Das Mathematikstudium an der Universität Innsbruck.*
5. Tag der offenen Tür (November 2007), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
6. Tag der Mathematik (February 2008), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
7. FIT – Frauen in die Technik (February 2009), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
8. Tag der offenen Tür (November 2009), Gerhard Kirchner, Mechthild Thalhammer. *Mathematik in Innsbruck – Studium und Berufsaussichten.*
9. Seminar High Performance Computing 2009/10 (January 2010), *Advanced discretisations of nonlinear Schrödinger equations. From Scientific to High Performance Computing.*
10. FIT – Frauen in die Technik (February 2010), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
11. FIT – Frauen in die Technik (February 2011), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
12. Tag der Mathematik (February 2011), *Mathematik in Innsbruck – Studium und Berufsaussichten.*

13. Girls' Day (April 2011), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
14. Girls' Day (April 2013), *Mathematik in Innsbruck – Studium und Berufsaussichten.*
15. Girls' Day (April 2018), *Mathematik in Innsbruck – Studium und Berufsaussichten.*

Further activities and awards

Editorial board

Member of the editorial board of BIT Numerical Mathematics (since January 2011)

Lead guest editor of *Special Issue on Advanced Numerical Methods for linear and nonlinear Schrödinger-type equations* in Journal Advances in Numerical Analysis

Reviews for research projects

Agence nationale de la recherche ANR (2017)

Regular reviews for scientific journals

Applied Mathematical Modelling (AMM)

Applied Mathematics and Computation (AMC)

Applied Numerical Mathematics – Transactions of IMACS

Applied Numerical Mathematics (APNUM)

BIT Numerical Mathematics

Foundations of Computational Mathematics manuscript (FOCM)

International Journal for Numerical Methods in Fluids

International Journal of Computer Mathematics (IJCM)

IMA Journal of Numerical Analysis (IMAJNA)

Journal of Computational and Applied Mathematics (CAM)

Journal of Computational Methods in Applied Mathematics (CMAM)

Journal of Computational Physics (JCOMP)

Journal of Computer Physics Communications (CPC)

Journal of Numerical Analysis, Industrial and Applied Mathematics (JNAIAM)

Journal of Mathematical Analysis and Applications (JMAA)

Mathematical Modelling and Numerical Analysis (M2AN)

Mathematics and Computers in Simulation (MATCOM)

Mathematics of Computation (MCOM)

Numerical Algorithms (NUMA)

Numerische Mathematik

Physica D: Nonlinear Phenomena

SIAM Journal on Numerical Analysis (SINUM)

SIAM Journal on Scientific Computing (SISC)

Member of committees at the University of Innsbruck

Berufungskommission Professur *Wahrscheinlichkeitstheorie und Statistik* (2007)
Habitationskommission Richard Kowar (2011)
Berufungskommission Professur *Funktionalanalysis und deren Anwendungen* (2011/2012)
Berufungskommission Professur *Mathematik* (2011/2012)
Habitationskommission Ralf Kissmann (2014)
Berufungskommission Professur *Angewandte Algebra und diskrete Mathematik* (2014/2015)
Beirat für Qualifizierungsvereinbarungen der MIP-Fakultät (2014/2015)
Berufungskommission Professur *Stochastik* (Vorsitzende, 2015/2016)
Habitationskommission Herman Mena (2016)
Senat (Ersatzmitglied, Amtsperiode ab 1.10.2016)
Habitationskommission Christian Bargetz (2017/2018)
Berufungskommission Theoretische Quantenphysik (2017/2018)
Berufungskommission Ingenieurmathematik (2017/2018)

Member of committees and reports

Defence of Bawfeh Kingsley Kometa (Trondheim, Norway, November 8, 2011)
Defence of Amir Saboor Bagherzadeh (Vienna, Austria, November 28, 2011)
Defence of Martin Tutz (Vienna, Austria, May 3, 2013)
Defence of Georg Kitzhofer (Vienna, Austria, November 15, 2013)
Defence of Guillaume Leboucher (Rennes, France, December 8, 2015)
Mattia Lupetti (Vienna, Report on PhD thesis, 2015)
Xiaowei Jia (Singapore, Report on PhD thesis, 2015)
Lukas Neumann (Innsbruck, Report on habilitation thesis, 2018)

Further activities

1. *Mathematik geht an die Schule*. Joint project with N. Netzer and W. Förg–Rob, 2007 – 2009.
2. *Vojtěch Jarník International Mathematical Competition 2010*, University of Ostrava, Member of the Jury.
3. *MATHE–Cool!* Joint project with N. Netzer and W. Förg–Rob, 2010/2011, funded by the *Bundesministerium für Wissenschaft und Forschung*. See <http://mathecool.uibk.ac.at>

Awards

1. *Würdigungspreis des Bundesministers für Wissenschaft, Verkehr und Kunst für Absolventen von Diplomstudien für das Jahr 1997*
2. *SIAM 100-Dollar, 100-Digit Challenge (2002): First Prize 100-digit Winner* together with Gerhard Kirchner, Alexander Ostermann, and Peter Wagner
3. *Preis der Landeshauptstadt Innsbruck für die wissenschaftliche Forschung an der Universität Innsbruck 2007*
4. *Frankreich–Preis der Universität Innsbruck 2008* (Kategorie Post-Doc)