

# Curriculum Vitae

updated: 2012-06-01

Jan Nordström

date of birth: November 16, 1953

Married, 4 children

## Degrees

- |      |                                                                                                            |
|------|------------------------------------------------------------------------------------------------------------|
| 1980 | Master of Science in Aeronautics, The Royal Institute of Technology (KTH) Stockholm, Sweden                |
| 1993 | PhD in Numerical Analysis, The Department of Scientific Computing Uppsala University (UU), Uppsala, Sweden |
| 1999 | Docent (Habilitation) in Numerical Analysis, UU                                                            |

## Positions held

- |             |                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1980 - 1995 | Research Scientist, The Aeronautical Research Institute of Sweden (FFA)                                                                                    |
| 1986 - 1991 | Acting head at the Viscous Flow Branch, FFA                                                                                                                |
| 1995 - 2001 | Senior Scientist, FFA                                                                                                                                      |
| 1995 - 1999 | Research leader for the Unsteady Aerodynamics group at FFA                                                                                                 |
| 1997 - 1999 | Adjunct Researcher, UU                                                                                                                                     |
| 1999 - 2001 | Research leader for the Wave Propagation group at FFA                                                                                                      |
| 1999 - 2001 | Research leader for the Numerical Methods group at FFA                                                                                                     |
| 2001 - 2002 | Senior Scientist, The Swedish Defense Research Agency (FOI)                                                                                                |
| 2001 - 2004 | Adjunct Professor, Numerical Analysis (Adjungerad), UU                                                                                                     |
| 2002 - 2010 | Director of Research (Forskningschef) in Numerical Analysis, FOI                                                                                           |
| 2006 - 2009 | Adjunct Professor, Numerical Analysis, UU                                                                                                                  |
| 2007 - 2009 | Visiting Professor, 6 months, Department of Mechanical Engineering, Stanford University (SU), USA                                                          |
| 2009 - 2010 | Adjunct Professor, Scientific Computing, UU                                                                                                                |
| 2009 - 2010 | Professor in Aeronautical Engineering, School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand (WITS), South Africa |
| 2009 -      | Senior Research Fellow, Center for Turbulence Research (CTR), SU, USA                                                                                      |
| 2010 -      | Visiting Professor, School of Electrical and Information                                                                                                   |

- 2010 - Technology, WITS, South Africa
- 2010 - Honorary Professor, School of Computational and Applied Mathematics, WITS, South Africa
- 2010 - Professor in Scientific Computing, Department of Mathematics, Linköping University (LiU), Sweden
- 2011 Visiting Professor, 3 months, Department of Mechanical Engineering, Stanford University, USA
- 2012 - Head of Division in Computational Mathematics, LiU, Sweden

### **Research visits and Consultant positions**

- 1987 Visiting Scientist, 3 months, NASA Ames, USA
- 1996 - 1997 Visiting Scientist, 2 months, ICASE, USA
- 1998 - 2002 7 months as ICASE (Institute of Computer Applications in Science and Engineering) Consultant
- 2003 - 2005 Visiting Scientist, 3 months, National Institute of Aerospace (NIA), USA
- 2003 - 2005 Consultant, 3 months, Appl. Math., Brown University, USA
- 2005 - 2007 Senior Visiting Fellow, 3 months, Center for Turbulence Research, SU, USA
- 2006 - 2008 Consultant 2 months/year for the Dept. of Vehicle and Aeronautical Engineering, KTH
- 2010 Visiting Scientist, 1 month, NIA, USA
- 2011 Visiting Scientist, 1 week, Caltech, USA

### **Invited to the following workshops**

- 2012 Mathematisches Forschungsinstitut Oberwolfach: Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering
- 2012 American Institute of Mathematic (AIM): Nonlinear solvers for high-intensity focused ultrasound with application to cancer treatment.

### **Expert, evaluation, committee and board work**

- 1991 - Master thesis advisor for 23 students
- 1997 - PhD thesis advisor for 13 students (9 ongoing)
- 2004 Independent Expert, EU 6th framework program, EST
- 2004 Independent Expert, EU 6th framework program, OIF

2004 Independent Expert, EU 6th framework program, IIF  
 2004 Member PhD Thesis evaluation committee  
 2004 Scientific reviewer for the Swedish Research Council  
 2005 Member PhD Thesis evaluation committee  
 2006 Independent Expert, EU 6th framework program, TOK  
 2007 - 2009 Scientific reviewer for the Georgian Research Council  
 2008 International Scientific Committee for Africomp2009  
 2009 Expert opinion for a succesful promotion at Stanford University  
 2009 Expert opinion for a succesfull application for the PECASE  
 (The Presidential Early Career Award for Scientists and Engineers) award  
 2010 International Scientific Committee for Africomp2011  
 2011 Scientific evaluator for the Cyprus Research Promotion Foundation  
 2011 Member PhD Thesis evaluation committee  
 2011 Scientific reviewer for Shota Rustaveli National Science  
 Foundation, Georgia  
 2011 Expert opinion for a succesful application to a faculty position  
 at the U.S. Naval Post Graduate School in Monterey  
 2012 - Member of the board of Linköping Institute of Technology (LiTH)  
 2012 Member of two Docent evaluation committees

### **Recent talks**

2011 Africomp2011, Keynote talk, Initial Boundary Value Problems,  
 Summation-by-parts Operators and Weak Boundary Conditions,  
 Cape Town, South Africa  
 2011 Weak Boundary and Interface Conditions with Multi-physics  
 Applications, Johannesburg, South Africa  
 2011 Initial Boundary Value Problems, Summation-by-parts Operators  
 and Weak Boundary Conditions, Pretoria, South Africa  
 2011 Weak Boundary and Interface Conditions with Multi-physics  
 Applications, Durban, South Africa  
 2011 The Popular Applied Mathematics seminar (PAM), Initial Boundary  
 Value Problems, Summation-by-parts Operators and Weak  
 Boundary Conditions, Uppsala, Sweden  
 2011 CTR seminar, Initial Boundary Value Problems, Summation-by-parts  
 Operators, Weak Boundary Conditions and Multi-physics  
 Applications, Stanford, USA  
 2011 ICIAM 2011, Initial Boundary Value Problems, Summation-by-parts  
 Operators and Weak Boundary Conditions, Vancouver, Canada

- 2011 ICIAM 2011, A New Boundary Procedure using a Modified Penalty Technique, Vancouver, Canada
- 2011 ICIAM 2011, Simulation of Energy Decay in Vortices, Vancouver, Canada
- 2011 Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Los Angeles, USA
- 2012 Linear and Nonlinear Boundary and Interface Problems, Oberwolfach workshop, Germany
- 2012 Recent Developments in Computational Mathematics at Linköping University, Dept. of Geophysics, Stanford, USA
- 2012 CTR Seminar: Recent Developments in Computational Mathematics at Linköping University, Stanford, USA
- 2012 Initial Boundary Value Problems and Boundary/Interface Conditions with Multi-Physics Applications, AIM workshop, Palo Alto, USA

### **Invited talks**

- 2007 American Mathematical Society, Mathematical and Computational aspects of Compressible Flow, Albuquerque, USA
- 2008 SIAM Annual meeting, Computational Methods for Compressible Flow, San Diego, USA
- 2010 SACAM10, Keynote talk, Weak Boundary and Interface Conditions with Multi-physics Applications, Pretoria, South Africa
- 2010 SIAM Annual Meeting, Nonlinear Boundary Conditions for Wave Propagation Problems, Pittsburgh, USA
- 2011 Africomp2011, Keynote talk, Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Cape Town, South Africa
- 2011 The Popular Applied Mathematics seminar (PAM), Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Uppsala, Sweden
- 2011 ICIAM 2011, Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Vancouver, Canada
- 2012 Linear and Nonlinear Boundary and Interface Problems, Oberwolfach workshop, Germany
- 2012 Initial Boundary Value Problems and Boundary/Interface Conditions with Multi-Physics Applications, AIM workshop, Palo Alto, USA

### **Ph.D. Student supervision**

- 1997 - 2003 Ken Mattsson, Thesis title: Summation-by-Parts

- Operators for High Order Finite Difference Methods
- 1999 - 2004 Magnus Svärd, Thesis title: Stable High Order Finite Difference Methods for Aerodynamics
- 2003 - 2007 Jing Gong, Thesis title: Hybrid Methods for Unsteady Fluid Flow Problems in Complex Geometries
- 2006 - 2011 Qaiser Abbas, Project: Hybrid methods for Aerodynamics and Aeroacoustics
- 2006 - Sven-Erik Ekström, Project: ADIGMA, A Vertex-Centered Dual Discontinuous Galerkin Method for Hyperbolic Problems, Martin Berggren UUM 1st advisor
- 2007 - Sofia Eriksson, Project: Hybrid methods for Unsteady Aerodynamics
- 2007 - Kenneth Duru, Project: Perfectly Matched Layers for non-linear wave propagation problems, Gunilla Kreiss UU 1st advisor
- 2008 - Jens Berg, Project: Computational methods for heat transfer in micro-mechanical systems
- 2008 - Per Pettersson, Project: Uncertainties in Aerodynamics, jointly with Gianluca Iaccarino, SU
- 2011 - Samira Nikkar, Project: High Order Accurate Numerical Methods in Fluid Dynamics
- 2011 - Tomas Lundquist, Project: High Order Accurate Numerical Methods in Fluid Dynamics for Complex Geometries
- 2011 - Ossian O'Reilly, Project: High Order Accurate Numerical Methods in Geophysics, jointly with Eric Dunham SU
- 2012 - Hannes Frennander, Project: High Order Accurate Numerical Methods for Wave Propagation Problems

### **Postdoc supervision**

- 2011 - Marco Kupiainen, Project: InDustrIalisation of Higher Order Methods (IDIHOM)

### **Teaching experience**

- 2001 Graduate course in Computational Aeroacoustics (UU)
- 2004 Graduate course in Artificial Boundary Conditions (UU)
- 2007 Undergraduate course in Scientific Computing (UU)
- 2007 Undergraduate course in Analysis of Numerical Methods (UU)
- 2008 Undergraduate course in Computational Fluid Dynamics (KTH)

- 2008 Graduate course in Initial Boundary Value Problems (UU)
- 2009 Graduate course in Numerical Methods for Initial Boundary Value Problems, Institute of Computational Mathematics in Engineering (iCME), Stanford University
- 2011 Graduate course in Numerical Methods for Initial Boundary Value Problems, Institute of Computational Mathematics in Engineering (iCME), Stanford University
- 2011 Graduate course in Numerical Methods for Initial Boundary Value Problems, Linköping University (LiU)

### **Review and editorial work**

- 1993 - Journal of Computational Physics
- 1995 - Applied Numerical Mathematics
- 1999 - Journal of Scientific Computing
- 1999 - SIAM, Journal of Numerical Analysis
- 1999 - SIAM, Journal of Scientific Computing
- 2008 - 2011 Editorial board of International Journal of Mechanics and MEMS
- 2009 - AIAA Journal
- 2010 - Journal of Mathematical Modeling and Numerical Analysis
- 2010 - Communications in Computational Physics (CiCP)
- 2010 - Computer Methods in Applied Mechanics and Engineering
- 2011 - Journal of Aerospace Engineering
- 2011 - BIT Numerical Mathematics
- 2012 - Applied Mathematics and Computation

### **Recent projects**

- 1996 - 2010 High order finite difference approximations, collaboration with ICASE, NIA and NASA, USA
- 1998 - 2010 Accelerating coordinate systems, collaboration with CSIR, South Africa
- 2004 - 2010 Unsteady Supersonic Aerodynamics, collaboration with WITS, South Africa
- 2005 - 2009 Hybrid Methods for Unsteady Aerodynamics, collaboration with CTR, the Centre for Turbulence Research, SU, USA
- 2007 - Uncertainties in Aerodynamics, collaboration with the Department of Mechanical Engineering, SU, USA

- 2008 - Computational methods for heat transfer in micro-mechanical systems, collaboration with Nanospace AB, Swedish Space Corporation Group, Sweden
- 2009 - Computational Methods for Earthquake Simulations, collaboration with the Department of Geophysics, SU, USA

### **Recently awarded grants**

- 2004 The Swedish Research Council: Unsteady aerodynamics of compressible flow, collaboration with WITS South Africa, planning grant, 75.000 SEK
- 2005 The Swedish Research Council: Generation and propagation of vortices in aerodynamic applications, collaboration with WITS South Africa, 450.000 SEK in 3 years
- 2007 The Swedish Governmental Agency for Innovation Systems: Numerical methods for micromechanical systems in space, collaboration with Nanospace AB, 1600.000 SEK in 4 years
- 2009 The Swedish Research Council: Nonlinear generation of internal waves in the deep ocean by tides, collaboration with MISU, Stockholm University, 1600.000 SEK in 3 years
- 2010 The European Union, FP7: IDIHOM Industrialisation of High-Order Methods, 181564 euro in 3 years
- 2012 The SeRC FLOW Community. Stable High-Order Boundary Conditions for In- and Outgoing Waves for Fluid Flow Problems 2400.000 SEK in 4 years

### **Advisor for the following PhD thesis**

1. K. Mattsson, Summation-by-Parts Operators for High Order Finite Difference Methods, Acta Univ. Ups. Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 828. 23 pp. Uppsala ISBN 91-554-5596-4. 2003.
2. M. Svärd, Stable High Order Finite Difference Methods for Aerodynamics, Acta Univ. Ups. Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 1026. 25 pp. Uppsala ISBN 91-554-6063-1. 2004.

3. J. Gong, Hybrid Methods for Unsteady Fluid Flow Problems in Complex Geometries, Acta Univ. Ups. Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 374. 28 pp. Uppsala ISBN 978-91-554-7046-3, 2007.
4. Q. Abbas, Weak Boundary and Interface Procedures for Wave and Flow Problems, Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, ISSN 1651-6214; 862, 2011.

**Advisor for the following Masters thesis**

1. A. Bengtsson & E. Ziakouli, The Influence of Open Boundary Conditions and Difference Operators on the Time-integration of the Burgers Equation, FFA TN 1988-57, Stockholm 1988.
2. N. Nordin, The Fringe Region Technique Used in the Direct Numerical Simulation of the Incompressible Navier-Stokes Equations, FFA TN 1995-04, Stockholm 1995.
3. F. Jansson, Boundary Conditions for the Compressible Navier-Stokes Equations at a Subsonic Outflow Boundary, FFA TN 1995-05, Stockholm 1995.
4. N. Lindberg, (jointly with Gunilla Efraimsson, FFA) Numerical Investigation of Extrapolation Boundary Conditions for the Euler Equations, FFA TN 1998-03, Stockholm 1998.
5. I. Karlsson, Boundary Conditions in the  $\kappa-\omega$  and  $\kappa-\epsilon$  Turbulence Models, FFA TN 1998-49, Stockholm 1998.
6. E. Petrini, (jointly with Gunilla Efraimsson, FFA) A Numerical Study of the Introduction and Propagation of a 2-D Vortex, FFA TN 1998-66, Stockholm 1998.
7. Rickard Lindkvist, Boundary Conditions for the Euler Equations, FFA TN 1999-31, Stockholm 1999.
8. Martin Björck, Finite Volume Approximations and Strict Stability for Hyperbolic Problems, FFA TN 2000-35, Stockholm 2000.

9. Björn Bretz, (jointly with Karl Forsberg, FFA) High Order Finite Difference Approximations of Hyperbolic Problems, FFA TN 2000-09, Stockholm 2000.
10. J. Persson, Discrete Approximations of Electromagnetic Problems, Scientific Report FOI-R-0119-SE, Stockholm 2001.
11. R. Gustafsson, High Order Finite Difference Approximations of Electromagnetic Wave Propagation Close to Material Discontinuities, Scientific Report FOI-R-0120-SE, Stockholm 2001.
12. C. Adamsson, (jointly with Karl Forsberg, FFA), Finite Volume Methods, Unstructured Meshes and Strict Stability, Scientific Report FOI-R-0121-SE, Stockholm 2001.
13. O. Fogelklou, Investigation of Time and Frequency Domain Based Methods for Radar Cross Section Calculations, Scientific Report FOI-R-0149-SE, Stockholm 2001.
14. A. Carlsson, Conservative Difference Formulations, Energy Estimates and Artificial Dissipation, Scientific Report FOI-R-0509-SE, Stockholm 2002.
15. S. Eriksson, (jointly with Magnus Svärd, Stanford University), Simulation of Ground Effects on Wake Vortices at Runways, Report ISSN: 1401-5757, UPTEC F07062, May 2007.
16. J. Lundberg, (jointly with Magnus Svärd, Stanford University), A Computational Study of Wing-Vortex Interaction Using a High Order Accurate Finite Difference Method, Report ISSN: 1401-5757, UPTEC F07089, May 2007.
17. P. Pettersson, (jointly with Gianluca Iaccarino, Stanford University), Numerical Analysis of Burgers' Equation with Uncertain Boundary Conditions Using the Stochastic Galerkin Method, UPTEC STS08011, March 2008.
18. N. Forsberg, (jointly with Gunilla Efraimsson, KTH), Simulation of Acoustic Waves in a Turbofan Engine Air Intake, UPTEC F09028, March 2009.
19. B. Lönn, Energy decay in vortices, UPTEC F11031, ISSN 1401-5757, June 2011.

20. O. O'Reilly, (jointly with E. M. Dunham, Stanford University), Coupled Finite Difference and Finite Volume Methods for Earthquake Rupture Dynamics in Complex Geometries. UPTEC F11040, August 2011.
21. C-F. Arndt, Energy estimates and variance estimation for hyperbolic stochastic partial differentialequations, LiTH-MAT-EX-2011/18-SE, September 2011.
22. T. Lundquist, Stability of SBP schemes on overlapping domains, LiTH-MAT-EX-2011/17-SE, September 2011.

### **Most cited publications**

(Google Scholar, Scopus, Web of Science)

1. M. H. Carpenter, J. Nordström & D. Gottlieb, A Stable and Conservative Interface Treatment of Arbitrary Spatial Accuracy, Journal of Computational Physics, Vol. 148 No. 2, pp. 341-365, 1999. Number of citations: (162, 110, 83)
2. K. Mattson & J. Nordström, Summation by parts operators for finite difference approximations of second derivatives, Journal of Computational Physics, Vol. 199, pp. 503-540, 2004. Number of citations: (105, 63, 48)
3. J. Nordström & M. H. Carpenter, Boundary and Interface Conditions for High Order Finite Difference Methods Applied to the Euler and Navier Stokes Equations, Journal of Computational Physics, Vol. 148 No. 2, pp. 621-645, 1999. Number of citations: (89, 55, 40)
4. J. Nordström, N. Nordin & D. Henningson, The Fringe Region Technique and the Fourier-method Used in the Direct Numerical Simulation of Spatially Evolving Viscous Flows, SIAM Journal of Scientific Computing, Vol. 20, No. 4, pp.1365-1393, 1999. Number of citations: (85, 47, -)
5. J. Nordström & M. H. Carpenter, High Order Finite Difference Methods, Multidimensional Linear Problems and Curvilinear Coordinates, Journal of Computational Physics, Vol. 173, pp. 149-174, 2001. Number of citations: (71, 44, 32)

## Articles

1. J. Nordström, The Influence of Open Boundary Conditions on the Convergence to Steady State of the Navier-Stokes Equation, *Journal of Computational Physics* Vol. 85, No. 1, pp. 210-244, 1989.
2. B. Gustafsson & J. Nordström, Extrapolation Procedures at Outflow Boundaries for the Navier-Stokes Equations, *Computing Methods in Applied Science and Engineering*, Paris 1990, pp.136-151, SIAM, Philadelphia, PA, 1990.
3. J. Nordström, Extrapolation Procedures for the Navier-Stokes Equations, *AIAA-journal* Vol. 30, No. 6, pp. 1654-1656, 1992.
4. J. Nordström, The Use of Characteristic Boundary Conditions for the Navier-Stokes Equations, *Computers & Fluids*, Vol. 24, No.5, pp. 609-623, 1995.
5. J. Nordström, Accurate Solutions of the Navier-Stokes Equations Despite Unknown Outflow Boundary Data, *Journal of Computational Physics* Vol. 120, pp. 184-205, 1995.
6. J. Nordström, On Extrapolation Procedures at Artificial Outflow Boundaries for the Time-Dependent Navier-Stokes Equations, *Applied Numerical Mathematics*, Vol. 23, pp. 457-468, 1997.
7. J. Nordström, N. Nordin & D. Henningson, The Fringe Region Technique and the Fourier-method Used in the Direct Numerical Simulation of Spatially Evolving Viscous Flows, *SIAM Journal of Scientific Computing*, Vol. 20, No. 4, pp.1365-1393, 1999.
8. J. Nordström, On Flux-extrapolation at Supersonic Outflow Boundaries, *Applied Numerical Mathematics*, Vol. 30, Issue 4, pp. 447-457, 1999.
9. M. H. Carpenter, J. Nordström & D. Gottlieb, A Stable and Conservative Interface Treatment of Arbitrary Spatial Accuracy, *Journal of Computational Physics*, Vol 148 No. 2, pp. 341-365, 1999.

10. J. Nordström & M. H. Carpenter, Boundary and Interface Conditions for High Order Finite Difference Methods Applied to the Euler and Navier Stokes Equations, *Journal of Computational Physics*, Vol 148 No. 2, pp. 621-645, 1999.
11. S. Tsynkov, S. Abarbanel, J. Nordström, V. Ryaben'kii & V. Vatsa, Global Artificial Boundary Conditions for Computation of External Flow Problems with Jets, *AIAA Journal*, vol. 38, no. 11, Nov. 2000, pp. 2014-2022.
12. G. Kreiss, G. Efrainsson & J. Nordström, Elimination of First Order Errors in Shock Calculations, *SIAM Journal of Numerical Analysis*, Vol. 38, No. 6, pp. 1986-1998, 2001.
13. J. Nordström & Martin Björck, Finite Volume Approximations and Strict Stability for Hyperbolic Problems, *Applied Numerical Mathematics*, Volume 38, Issue 3, pp. 237-255, 2001.
14. J. Nordström, Model Problems and The Analysis of Boundary Procedures in CFD, in *Absorbing Boundaries and Layers, Domain Decomposition Methods, Application to Large Scale Computations*, Edited by L. Tourette and L. Halpern, ISBN 1-56072-940-6, Novascience, 2001.
15. J. Nordström & M. H. Carpenter, High Order Finite Difference Methods, Multidimensional Linear Problems and Curvilinear Coordinates, *Journal of Computational Physics*, Vol 173, pp. 149-174, 2001.
16. T Hagstrom & J. Nordström, Analysis of Extrapolation Boundary Conditions for the Linearized Euler Equations, *Applied Numerical Mathematics*, Volume 44, pp. 95-108, 2003.
17. J. Nordström & R. Gustafsson, High Order Finite Difference Approximations of Electromagnetic Wave Propagation Close to Material Discontinuities, *Journal of Scientific Computing*, Vol 18, No 2, 2003.
18. J. Nordström, K. Forsberg, C. Adamsson & P. Eliasson, Finite Volume Methods, Unstructured Meshes and Strict Stability, *Applied Numerical Mathematics*, Volume 48, pp. 453-473, 2003.

19. K. Mattsson M. Svärd and J. Nordström, Stable and Accurate Artificial Dissipation, *Journal of Scientific Computing*, Volume 21, No. 1, pp. 57-79, 2004.
20. M. Svärd and J. Nordström, Stability of Finite Volume Approximations for the Laplacian Operator on Quadrilateral and Triangular Grids, *Applied Numerical Mathematics*, Volume 51, pp. 101-124, 2004.
21. K. Mattsson & J. Nordström, Summation by parts operators for finite difference approximations of second derivatives, *Journal of Computational Physics*, Vol. 199, pp. 503-540, 2004.
22. M. Svärd, K. Mattsson & J. Nordström, Steady State Computations Using Summation-By-Parts Operators, *Journal of Scientific Computing*, Volume 24, No. 1, pp. 79-95, 2005.
23. J. Nordström & J. Gong, A Stable and Efficient Hybrid Method for Aeroacoustic Sound Generation and Propagation, *Comptes Rendus Mecanique* 333, pp. 713-718, 2005.
24. J. Nordström & M. Svärd, Well Posed Boundary Conditions for the Navier-Stokes Equation, *SIAM Journal on Numerical Analysis*, Vol. 43, No. 3, pp. 1231-1255, 2005.
25. J. Nordström & J. Gong, A Stable Hybrid Method for Hyperbolic Problems, *Journal of Computational Physics*, Vol. 212, pp. 436-453, 2006.
26. M. Svärd, J. Gong & J. Nordström, Stable Artificial Dissipation Operators for Finite Volume Schemes on Unstructured Grids, *Applied Numerical Mathematics*, Volume 56, pp. 1481-1490, 2006.
27. M. Svärd & J. Nordström, On the Order of Accuracy for Difference Approximations of Initial-Boundary Value Problems, *Journal of Computational Physics*, Vol. 218, pp. 333-352, 2006.
28. K. Mattsson & J. Nordström, High Order Finite Difference Methods for Wave Propagation in Discontinuous Media, *Journal of Computational Physics*, Vol. 220, pp. 249-269, 2006.
29. J. Nordström, Conservative Finite Difference Formulations, Variable Coefficients, Energy Estimates and Artificial Dissipation, *Journal of Scientific Computing*, Vol. 29, pp. 375-404, 2006.

30. K. Mattson, M. Svärd, M. H. Carpenter & J. Nordström, Highly Accurate Computations for Unsteady Aerodynamics, *Computers & Fluids*, Volume 36, Issue 3, Pages 636-649, 2007.
31. J. Nordström, K. Mattsson & Charles Swanson, Boundary Conditions for a Divergence Free Velocity-Pressure Formulation of the Navier-Stokes Equations, *Journal of Computational Physics*, Volume 225, Issue 1, Pages 874-8901, 2007.
32. M. Svärd, M. H. Carpenter & J. Nordström, A Stable High-Order Finite Difference Scheme for the Compressible Navier-Stokes Equations, far-field boundary conditions, *Journal of Computational Physics*, Volume 225, Issue 1, Pages 1020-1038, 2007.
33. J. Nordström, Error Bounded Schemes for Time-dependent Hyperbolic Problems, *SIAM Journal of Scientific Computing*, Volume 30, Pages 46-59, 2007.
34. J. Gong & J. Nordström, A Stable and Efficient Hybrid Scheme for Viscous Problems in Complex Geometries, *Journal of Computational Physics*, Volume 226, Pages 1291-1309, 2007.
35. M. Svärd, J. Gong & J. Nordström, An Accuracy Evaluation of Unstructured Node-Centered Finite Volume Methods, *Applied Numerical Mathematics*, Vol 58, pp 1142-1158, 2008.
36. M. Svärd & J. Nordström, A Stable High-Order Finite Difference Scheme for the Compressible Navier-Stokes Equations: Wall Boundary Conditions, *Journal of Computational Physics*, Vol. 227, pp. 4805-4824, 2008.
37. M. Berggren, S.E. Ekström and J. Nordström, A discontinuous Galerkin extension of the vertex-centered edge-based finite volume method, *Communications in Computational Physics (CiCP)*, Vol. 5, pp 456-468, 2009.
38. J. Nordström, S. Eriksson, C. Law & J. Gong, Shock and Vortex Calculations Using a Very High Order Accurate Euler and Navier-Stokes Solver, *International Journal of Mechanics and MEMS (JMM)*, Volume 1, No. 1, 2009.

39. J. Nordström, F. Ham, M. Shoeybi, E. van der Weide, M. Svärd, K. Mattsson, G. Iaccarino & J. Gong, A Hybrid Method for Unsteady Inviscid Fluid Flow, *Computers & Fluids*, Vol. 38, pp. 875-882, 2009.
40. I. M. A. Gledhill, K. Forsberg, P. Eliasson, J. Baloyi & J. Nordström, Investigation of acceleration effects on missile aerodynamics using Computational Fluid Dynamics, *Aerospace Science & Technology*, Volume 13, Issues 4-5, pp. 197-203, June-July 2009.
41. S. Eriksson & J. Nordström, Analysis of the Order of Accuracy for Node-centered Finite Volume Schemes, *Applied Numerical Mathematics* Volume 59, Issue 10, pp. 2659-2676, October 2009.
42. P. Pettersson, G. Iaccarino & J. Nordström, Numerical analysis of the Burger's equation in the presence of uncertainty, *Journal of Computational Physics*, Vol. 228, pp. 8394-8412, 2009.
43. J. Nordström, J. Gong, E. van der Weide and M. Svärd, A Stable and Conservative High Order Multi-block Method for the Compressible Navier-Stokes Equations, *Journal of Computational Physics*, Vol. 228, pp. 9020-9035, 2009.
44. Q. Abbas and J. Nordström, Weak Versus Strong No-slip Boundary Conditions for the Navier-Stokes Equation, *Engineering Applications of Computational Fluid Mechanics*, Vol. 4, No. 1, pp. 29-38, 2010.
45. P. Pettersson, J. Nordström & G. Iaccarino, Boundary Procedures for the Time-dependent Burgers' Equation under Uncertainty, *Acta Mathematica Scientia*, 30B(2):539550, 2010.
46. M. H. Carpenter, J. Nordström & D. Gottlieb, Revisiting and Extending Interface Penalties for Multi-Domain Summation-By-Parts Operators, *Journal of Scientific Computing*, Vol. 45, pp. 118-150, 2010.
47. J. Nordström and S. Eriksson, Fluid Structure Interaction Problems: the Necessity of a Well Posed, Stable and Accurate Formulation, *Communications in Computational Physics (CiCP)*, Vol. 8, pp. 1111-1138, 2010.

48. M. Svärd, J. Lundberg & J. Nordström, A Computational Study of Wing-Vortex Interaction Using High Order Finite Difference Methods, *Computers & Fluids*, Vol. 39, pp. 1267-1274, 2010.
49. J. Lindström & J. Nordström, A Stable and High Order Accurate Conjugate Heat Transfer Problem, *Journal of Computational Physics*, Vol. 229, pp. 5440-5456, 2010.
50. S. Eriksson, Q. Abbas and J. Nordström, A stable and conservative method of locally adapting the design order of finite difference schemes. *Journal of Computational Physics* 230, pp. 4216-4231, 2011.
51. J. Berg & J. Nordström, Stable Robin Solid Wall Boundary Conditions for the Navier-Stokes Equations. *Journal of Computational Physics* 230, pp. 7519-7532, 2011.
52. J. Gong & J. Nordström, Interface Procedures for Finite Difference Approximations of the Advection-diffusion Equation, *Journal of Computational and Applied Mathematics*. Vol. 236, Issue 5, pp. 601-996, 2011.
53. J. E. Kozdon, E. M. Dunham & J. Nordström, Interaction of Waves with Frictional Interfaces Using Summation-By-Parts Difference Operators: Weak Enforcement of Nonlinear Boundary Conditions, *Journal of Scientific Computing*, Volume 50, No 2, Pages 341-367, 2012.
54. J. Nordström, S. Eriksson and P. Eliasson, Weak and Strong Wall Boundary Procedures and Convergence to Steady-State of the Navier-Stokes Equations, *Journal of Computational Physics*, Vol 231, pp. 4867-4884, 2012.
55. J. Berg & J. Nordström, Spectral analysis of the continuous and discretized heat and advection equation on single and multiple domains, accepted in *Applied Numerical Mathematics*.

#### **Articles under review**

1. J. Nordström & B. Lönn, Energy Decay of Vortices in Viscous Fluids: an Applied Mathematics View.

2. J. E. Kozdon, E. M. Dunham & J. Nordström, Simulation of Dynamic Earthquake Ruptures in Complex Geometries Using High-Order Finite Difference Methods.
3. J. Nordström & J. Berg, Conjugate heat transfer using modified interface conditions for the Navier-Stokes equations
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