

# Publications for Anders Logg 2009-08-31

## Articles in International Journals

- [1] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs I*, SIAM J. Sci. Comput., vol. 24, pp. 1879–1902, 2003.
- [2] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs II: Implementation and Applications*, SIAM J. Sci. Comput., vol. 25, pp. 1119–1141, 2003.
- [3] K. ERIKSSON, C. JOHNSON AND A. LOGG, *Explicit Time-Stepping for Stiff ODEs*, SIAM J. Sci. Comput., vol. 25, pp. 1142–1157, 2003.
- [4] A. LOGG, *Multi-Adaptive Time-Integration*, Applied Numerical Mathematics, vol. 48, pp. 339–354, 2004.
- [5] J. JANSSON, C. JOHNSON AND A. LOGG, *Computational Modeling of Dynamical Systems*, Mathematical Models and Methods in Applied Sciences, vol. 15, pp. 471–481, 2005.
- [6] R. C. KIRBY, M. G. KNEPLEY, A. LOGG AND L. R. SCOTT, *Optimizing the Evaluation of Finite Element Matrices*, SIAM J. Sci. Comput., vol. 27, pp. 741–758, 2005.
- [7] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs III: A Priori Error Estimates*, SIAM J. Numer. Anal., vol. 43, pp. 2624–2646, 2006.
- [8] R. C. KIRBY AND A. LOGG, *A Compiler for Variational Forms*, ACM Transactions on Mathematical Software, vol. 32, pp. 417–444, 2006.
- [9] R. C. KIRBY, A. LOGG, L. R. SCOTT AND A. R. TERREL, *Topological Optimization of the Evaluation of Finite Element Matrices*, SIAM J. Sci. Comput., vol. 28, pp. 224–240, 2006.
- [10] A. LOGG, *Automating the Finite Element Method*, Arch. Comput. Methods Eng., vol. 14, pp. 93–138, 2007.
- [11] R. C. KIRBY AND A. LOGG, *Efficient Compilation of a Class of Variational Forms*, ACM Transactions on Mathematical Software, vol. 33, 2007.

- [12] J. JANSSON AND A. LOGG, *Algorithms and Data Structures for Multi-Adaptive Time-Stepping*, ACM Trans. Math. Software, vol. 35, pp. 1–24, 2008.
- [13] R. C. KIRBY AND A. LOGG, *Benchmarking Domain-Specific Compiler Optimizations for Variational Forms*, ACM Transactions on Mathematical Software, vol. 35, pp. 1–18, 2008.
- [14] K. B. OELGAARD, A. LOGG AND G. N. WELLS, *Automated Code Generation for Discontinuous Galerkin Methods*, SIAM J. Sci. Comput., vol. 31, pp. 849–864, 2008.
- [15] M. S. ALNÆS, A. LOGG, K.-A. MARDAL, O. SKAVHAUG AND H. P. LANGTANGEN, *Unified Framework for Finite Element Assembly*, accepted for publication in International Journal of Computational Science and Engineering, 2009.
- [16] A. LOGG, *Efficient Representation of Computational Meshes*, accepted for publication in International Journal of Computational Science and Engineering, 2009.
- [17] M. ROGNES, R. C. KIRBY AND A. LOGG, *Efficient Assembly of  $H(\text{div})$  and  $H(\text{curl})$  Conforming Finite Elements*, submitted to SIAM J. Sci. Comput., 2008.
- [18] A. LOGG AND G. N. WELLS, *DOLFIN: Automated Finite Element Computing*, submitted to ACM Transactions on Mathematical Software, 2009.

## Books

- [19] J. HOFFMAN, C. JOHNSON AND A. LOGG, *Dreams of Calculus: Perspectives on Mathematics Education*, Springer-Verlag, 2004.

## Chapters in Books

- [20] K. ERIKSSON, C. JOHNSON AND A. LOGG, *Adaptive Computational Methods for Parabolic Problems*, in *Encyclopedia of Computational Me-*

*chanics*, edited by E. Stein, R. d. Borst and T. J. R. Hughes, Wiley Press, chapter 24, 2004.

- [21] A. LOGG, K.-A. MARDAL, M. S. ALNÆS, H. P. LANGTANGEN AND O. SKAVHAUG, *A Hybrid Approach to Efficient Finite Element Code Development*, in *Petascale Computing: Algorithms and Applications*, edited by D. A. Bader, Chapman and Hall, chapter 19, 2007.
- [22] A. LOGG, *Att Lösa En Differentialekvation*, in *Människor och matematik*, edited by O. Helenius and K. Wallby, Nationellt centrum för matematikutbildning, NCM, pp. 95–109, 2008.
- [23] A. LOGG, H. P. LANGTANGEN AND X. CAI, *Past and Future Perspectives on Scientific Software*, in *Simula Research Laboratory - by thinking constantly about it*, edited by A. Tveito, A. M. Bruaset and O. Lysne, Springer-Verlag, chapter x, 2009.

## Refereed Proceedings

- [24] A. LOGG, *Efficient Representation of Computational Meshes*, in *MekIT'07*, 2007.
- [25] M. SIKLOSI, O. E. JENSEN, R. H. TEW AND A. LOGG, *Multiscale Modeling of the Acoustic Properties of Lung Parenchyma*, in *Mathematical and numerical modelling of the human lung*, 2008.
- [26] K. SELIM AND A. LOGG, *Simulating Heart Valve Dynamics in FEniCS*, in *MekIT'07*, 2009.

## Conference Proceedings

- [27] C. JOHNSON, J. HOFFMAN AND A. LOGG, *Topics in Adaptive Computational Methods for Differential Equations*, in *CEDYA 2001: Congreso de Ecuaciones Diferenciales y Aplicaciones*, 2001.
- [28] J. HOFFMAN, C. JOHNSON AND A. LOGG, *Mathematics and Computation*, in *Stockholm Intelligencer: Fourth European Congress of Mathematics*, 2004.

- [29] A. LOGG, *Automated Solution of Differential Equations*, in *Sixth International Congress on Industrial Applied Mathematics (ICIAM07) and GAMM Annual Meeting, Zürich 2007*, 2007.
- [30] K. B. OELGAARD, G. N. WELLS AND A. LOGG, *Automated Computational Modelling for Solid Mechanics*, in *IUTAM Symposium on Theoretical, Modelling and Computational Aspects of Inelastic Media*, 2008.
- [31] H. P. LANGTANGEN AND A. LOGG, *Trends in Computational Mechanics Software*, in *21st Nordic Seminar on Computational Mechanics*, 2008.
- [32] H. NARAYANAN, K. GARIKIPATI AND A. LOGG, *Collaborative Computational Frameworks and the Growth Problem*, in *The mathematics of growth and remodelling of soft biological tissues*, 2008.
- [33] A. LOGG, *An Overview of the FEniCS Project*, in *21st Nordic Seminar on Computational Mechanics*, 2008.

## Technical Reports

- [34] A. LOGG, *Multi-Adaptive Error Control for ODEs*, Oxford University Computing Laboratory NA Group, 1998.
- [35] A. LOGG, *A Multi-Adaptive ODE-Solver*, Finite Element Center, 2000.
- [36] A. LOGG, *Multi-Adaptive Error Control for ODEs*, Finite Element Center, 2000.
- [37] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs I: Theory and Algorithms*, Finite Element Center, 2001.
- [38] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs II: Applications*, Finite Element Center, 2001.
- [39] A. LOGG, *Topics in Adaptive Computational Methods for Differential Equations*, Finite Element Center, 2001.
- [40] J. HOFFMAN AND A. LOGG, *DOLFIN: Dynamic Object Oriented Library for FINite Element Computation*, Finite Element Center, 2002.

- [41] K. ERIKSSON, C. JOHNSON AND A. LOGG, *Explicit Time-Stepping for Stiff ODEs*, Finite Element Center, 2002.
- [42] A. LOGG, *Multi-Adaptive Time Integration*, Finite Element Center, 2003.
- [43] K. ERIKSSON, C. JOHNSON AND A. LOGG, *Adaptive Computational Methods for Parabolic Problems*, Finite Element Center, 2003.
- [44] T. DUPONT, J. HOFFMAN, C. JOHNSON, R. C. KIRBY, M. G. LARSON, A. LOGG AND L. R. SCOTT, *The FEniCS Project*, Finite Element Center, 2003.
- [45] A. LOGG, *Interpolation Estimates for Piecewise Smooth Functions in One Dimension*, Finite Element Center, 2004.
- [46] A. LOGG, *Estimates of Derivatives and Jumps Across Element Boundaries for Multi-Adaptive Galerkin Solutions of ODEs*, Finite Element Center, 2004.
- [47] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs III: Existence and Stability*, Finite Element Center, 2004.
- [48] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs IV: A Priori Error Estimates*, Finite Element Center, 2004.
- [49] J. JANSSEN AND A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs V: Stiff Problems*, Finite Element Center, 2004.
- [50] J. JANSSEN AND A. LOGG, *Algorithms for Multi-Adaptive Time-Stepping*, Finite Element Center, 2004.
- [51] J. JANSSEN AND A. LOGG, *Simulation of Mechanical Systems With Individual Time Steps*, Finite Element Center, 2004.
- [52] J. JANSSEN, C. JOHNSON AND A. LOGG, *Computational Modeling of Dynamical Systems*, Finite Element Center, 2004.
- [53] R. C. KIRBY AND A. LOGG, *A Compiler for Variational Forms*, Finite Element Center, 2005.

- [54] R. C. KIRBY, A. LOGG, L. R. SCOTT AND A. R. TERREL, *Topological Optimization of the Evaluation of Finite Element Matrices*, Finite Element Center, 2005.
- [55] A. LOGG, *Automating the Finite Element Method*, Finite Element Center, 2006.
- [56] J. JANSSON AND A. LOGG, *Algorithms and Data Structures for Multi-Adaptive Time-Stepping*, Finite Element Center, 2006.
- [57] R. C. KIRBY AND A. LOGG, *Efficient Compilation of a Class of Variational Forms*, Finite Element Center, 2006.
- [58] A. LOGG, *Efficient Representation of Computational Meshes*, Finite Element Center, 2007.
- [59] R. C. KIRBY AND A. LOGG, *Benchmarking Domain-Specific Compiler Optimizations for Variational Forms*, Finite Element Center, 2007.

## Manuals

- [60] M. S. ALNÆS, A. LOGG, K.-A. MARDAL, O. SKAVHAUG AND H. P. LANGTANGEN, *UFC Specification and User Manual*, 2009.
- [61] J. HOFFMAN AND A. LOGG, *Puffin User Manual*, 2004.
- [62] A. LOGG, *FFC User Manual*, 2007.
- [63] A. LOGG AND G. N. WELLS, *DOLFIN User Manual*, 2007.

## Theses

- [64] A. LOGG, *A Multi-Adaptive ODE-Solver*, M.Sc. Thesis, Chalmers University of Technology, 1998.
- [65] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs*, Lic. Thesis, Chalmers University of Technology, 2001.
- [66] A. LOGG, *Automation of Computational Mathematical Modeling*, Ph.D. Thesis, Chalmers University of Technology, 2004.

## Talks

- [67] A. LOGG, *Mechlab*, Nordic Computational Differential Equations Circus, Chalmers Göteborg, 1998.
- [68] A. LOGG, *A Multi-Adaptive ODE-Solver*, Nordic Computational Differential Equations Circus, Helsinki, 1999.
- [69] A. LOGG, *Multiadaptivity in Pictures*, Nordic Computational Differential Equations Circus, Bergen, 2000.
- [70] A. LOGG, *Strategies for Multi-Adaptive Time-Stepping*, Finite Element Center Workshop, Chalmers Göteborg, 2000.
- [71] A. LOGG, *Higher-Order Elements and the Lorenz System*, Nordic Computational Differential Equations Circus, Tampere, 2001.
- [72] A. LOGG, *Computability of the Lorenz System and the Solar System*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2001.
- [73] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs*, Licentiate Seminar, Chalmers Göteborg, 2001.
- [74] A. LOGG, *Multi-Adaptive Galerkin Methods for ODEs*, International Conference on Scientific Computation and Differential Equations (SciCADE 2001), Vancouver, 2001.
- [75] A. LOGG, J. HOFFMAN AND C. JOHNSON, *On the Computability of the Incompressible Navier-Stokes Equations*, AMFLOW, Heidelberg, 2001.
- [76] A. LOGG, *Beräkningsmatematik*, Birger Sjöberggymnasiet, Vänersborg, 2001.
- [77] C. JOHNSON, J. HOFFMAN AND A. LOGG, *Two Topics in Adaptivity*, Congreso de Ecuaciones Diferenciales y Aplicaciones (CEDYA 2001), Salamanca, 2001.
- [78] A. LOGG, *Beräkningsmatematik*, Burgårdsgymnasiet, Göteborg, 2002.

- [79] J. HOFFMAN AND A. LOGG, *Dynamic Object-Oriented Library for Finite Element Computation*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2002.
- [80] A. LOGG, K. ERIKSSON AND C. JOHNSON, *Explicit Time-Stepping for Stiff ODEs*, Finite Element Center Workshop, Chalmers Göteborg, 2002.
- [81] A. LOGG, K. ERIKSSON AND C. JOHNSON, *Explicit Time-Stepping for Stiff ODEs*, Third China-Sweden Workshop on Computational Mathematics, Chalmers Göteborg, 2002.
- [82] A. LOGG, *Matematisk Modellering Och Beräkning*, Centre of Chemical Process Engineering (CPE), Chalmers Göteborg, 2002.
- [83] A. LOGG, *A Priori Error Analysis of Multi-Adaptive Galerkin Methods*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2002.
- [84] A. LOGG, *Matematisk Modellering Och Beräkning*, Chalmers Day, Chalmers Göteborg, 2002.
- [85] A. LOGG, K. ERIKSSON AND C. JOHNSON, *Multi-Adaptive Time Integration*, Innovative Time Integrators for PDEs Workshop (IIPDE 2002), CWI Amsterdam, 2002.
- [86] A. LOGG, *Computational Mathematical Modelling*, Seminar, Chalmers Göteborg, 2002.
- [87] C. JOHNSON, J. HOFFMAN AND A. LOGG, *The DOLFIN Project - a Platform for Finite Element Computation*, Isaac Newton Institute, Cambridge, 2003.
- [88] A. LOGG, *Adaptive Explicit Time-Stepping for Stiff ODEs*, First European Finite Element Fair, Cambridge, 2003.
- [89] A. LOGG, K. ERIKSSON AND C. JOHNSON, *Explicit Time-Stepping for Stiff ODEs*, CWI Seminar, CWI Amsterdam, 2003.
- [90] A. LOGG, *Current Status of DOLFIN - a Guide for Prospective Developers*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2003.



- [91] A. LOGG, *Time Integration of ODEs and PDEs With Multi-Adaptive Galerkin Methods*, First International Conference on Adaptive Modelling Simulation (ADMOS 2003), Chalmers Göteborg, 2003.
- [92] A. LOGG, *A General Adaptive Finite Element Solver With Application to Turbulent Reactive Flow*, New Era for Chemical Reactors Workshop, Chalmers Göteborg, 2003.
- [93] A. LOGG, *Automation of Computational Mathematical Modeling: the FEniCS Project*, TTI Seminar, Chicago, 2003.
- [94] A. LOGG, *Automation of Computational Mathematical Modeling*, Ph.D. Seminar, Chalmers Göteborg, 2004.
- [95] A. LOGG, *Automation of Computational Mathematical Modeling*, TTI Seminar, Chicago, 2004.
- [96] A. LOGG, *Automation of Computational Mathematical Modeling*, University of Chicago Graduate Seminar, Chicago, 2004.
- [97] A. LOGG, *A Compiler for Variational Forms*, TTI Seminar, Chicago, 2004.
- [98] A. LOGG, *A Compiler for Variational Forms*, KTH/NADA, Stockholm, 2004.
- [99] A. LOGG, *A Compiler for Variational Forms*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2004.
- [100] A. LOGG, *FFC: a Compiler for Variational Forms*, SIAM Conference on Computational Science and Engineering (SIAM CSE 2005), Orlando, 2005.
- [101] A. LOGG, *Benchmark Results for the FEniCS Form Compiler*, TTI Seminar, Chicago, 2005.
- [102] A. LOGG, *Automating the Finite Element Method*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2005.
- [103] A. LOGG, *Automating the Finite Element Method*, KTH/NADA, Stockholm, 2005.

- [104] A. LOGG, *Automating the Finite Element Method*, Simula Research Laboratory, Oslo, 2005.
- [105] A. LOGG, *A New Family of Methods for Global Error Control in ODE Solvers*, Simula Research Laboratory, Oslo, 2005.
- [106] A. LOGG, *How to Solve Differential Equations and How to Automate It*, TTI Student Seminar, Chicago, 2005.
- [107] A. LOGG, *Extending and Optimizing the FEniCS Form Compiler*, FEniCS'05 Workshop, Chicago, 2005.
- [108] A. LOGG, *How Large Is the Error?*, TTI Seminar, Chicago, 2005.
- [109] A. LOGG, *Automating the Finite Element Method*, Lecture series at the Sixth Winter School in Computational Mathematics, Geilo, 2006.
- [110] A. LOGG, *Current and Future Plans for FEniCS*, BIT Circus, Stockholm, 2006.
- [111] A. LOGG, *The FEniCS Project: Philosophy, Current Status and Future Plans*, FEniCS'06 Workshop, Delft, 2006.
- [112] A. LOGG, *A New Mesh Library for DOLFIN*, FEniCS'06 Workshop, Delft, 2006.
- [113] A. LOGG, *A New Mesh Library for DOLFIN/PyCC*, Simula Scientific Computing Seminar, Tallinn, 2006.
- [114] A. LOGG, *Efficient Representation of Computational Meshes*, MekIT'07, Trondheim, 2007.
- [115] A. LOGG AND O. SKAVHAUG, *Software Components for Solving PDEs*, Modelling and Computation of Biomedical Processes Workshop, Simula Oslo, 2007.
- [116] A. LOGG, *Automated Solution of Differential Equations*, 6th International Congress on Industrial and Applied Mathematics (ICIAM 2007), Zürich, 2007.
- [117] A. LOGG, *Finite Element Code Generation: Simplicity, Generality, Efficiency*, Software Issues in Computational Science and Engineering (SCSE 2007), Uppsala, 2007.

- [118] A. LOGG, *Activities at Simula: FEniCS and the Center for Biomedical Computing*, Computational and Applied Mathematics Seminar, Chalmers Göteborg, 2007.
- [119] A. LOGG, *Solving PDEs With FEniCS/DOLFIN*, Simula Scientific Computing Seminar, Berlin, 2007.
- [120] A. LOGG, *The FEniCS Project*, Workshop on Data Structures for Finite Element and Finite Volume Computations, Freie Universität Berlin, 2008.
- [121] A. LOGG, *A Symbolic Engine for Finite Element Exterior Calculus*, Workshop on Automating the Development of Scientific Computing Software (FEniCS'08), Louisiana State University, Baton Rouge, 2008.
- [122] A. LOGG, *Just-in-Time Compilation of Finite Element Variational Forms*, the Finite Element Circus and Rodeo, Louisiana State University, Baton Rouge, 2008.
- [123] A. LOGG, *A Symbolic Engine for Finite Element Exterior Calculus*, European Finite Element Fair 2008, Chalmers, Göteborg, 2008.
- [124] A. LOGG, *FSI Development at CBC*, Workshop on FSI for Biomedical Applications, Trondheim, 2008.
- [125] A. LOGG, *FEniCS Tutorial*, CBC Seminar, Oslo, 2008.
- [126] A. LOGG, *An Overview of the FEniCS Project*, 21st Nordic Seminar on Computational Mechanics, Trondheim, 2008.
- [127] A. LOGG, *Automatic Code Generation and the FEniCS Project*, Opportunities and Challenges in Computational Geodynamics, Caltech, 2009.
- [128] A. LOGG, *FEniCS: Automated Computing*, Workshop on Computational Fluid Dynamics, Simula Research Laboratory, Oslo, 2009.
- [129] A. LOGG, *Introduction to FEniCS'09*, FEniCS'09, Simula Research Laboratory, Oslo, 2009.
- [130] A. LOGG AND O. SKAVHAUG, *Parallel Data Structures and Algorithms in DOLFIN*, HPC Workshop, Simula Research Laboratory, 2009.

- [131] A. LOGG, *Automated Finite Element Discretization*, Workshop on Compatible and Innovative Discretizations for Partial Differential Equations, Oslo, 2009.
- [132] A. LOGG, *DOLFIN: Automated Finite Element Computing*, ENUMATH'09, Uppsala, 2009.

## Other Publications

- [133] G. CHRISTIANSSON AND A. LOGG, *Vätskekristaller: En Kort Introduktion*, Scientium, 1996.
- [134] G. CHRISTIANSSON AND A. LOGG, *Vätskekristaller Del 2: LCD (vätskekristall-Displayer)*, Scientium, 1996.
- [135] A. LOGG, *Tanganyika*, URL: <http://www.phi.chalmers.se/tanganyika/>, 2001.
- [136] J. HOFFMAN AND A. LOGG, *Puffin*, URL: <http://www.fenics.org/puffin/>, 2006.
- [137] A. LOGG, J. JANSSON ET AL., *Body and Soul Computer Sessions*, URL: <http://www.bodysoulmath.org/sessions/>, 2006.
- [138] A. LOGG, *Automating the Finite Element Method*, Lecture notes for the Sixth Winter School in Computational Mathematics, 2006.
- [139] A. LOGG, *Beräkningsmatematik*, URL: <http://www.forskning.se>, 2008.
- [140] FENICS, *FEniCS Project*, URL: <http://www.fenics.org/>, 2009.
- [141] A. LOGG, G. N. WELLS ET AL., *DOLFIN*, URL: <http://www.fenics.org/dolfin/>, 2009.
- [142] A. LOGG ET AL., *FFC*, URL: <http://www.fenics.org/ffc/>, 2009.
- [143] M. S. ALNÆS, A. LOGG, K.-A. MARDAL, O. SKAVHAUG AND H. P. LANGTANGEN, *UFC*, URL: <http://www.fenics.org/ufc/>, 2009.

- [144] M. S. ALNÆS AND A. LOGG, *UFL*, URL: <http://www.fenics.org/ufl/>, 2009.
- [145] A. LOGG AND K.-A. MARDAL, *Exterior*, URL: [http://www.fenics.org/wiki/Finite\\_Element\\_Exterior\\_Calculus](http://www.fenics.org/wiki/Finite_Element_Exterior_Calculus), 2009.