

Contents

A Leibniz Notation for Automatic Differentiation.....	1
Bruce Christianson	
Sparse Jacobian Construction for Mapped Grid Visco-Resistive Magnetohydrodynamics	11
Daniel R. Reynolds and Ravi Samtaney	
Combining Automatic Differentiation Methods for High-Dimensional Nonlinear Models	23
James A. Reed, Jean Utke, and Hany S. Abdel-Khalik	
Application of Automatic Differentiation to an Incompressible URANS Solver	35
Emre Özkaya, Anil Nemili, and Nicolas R. Gauger	
Applying Automatic Differentiation to the Community Land Model	47
Azamat Mametjanov, Boyana Norris, Xiaoyan Zeng, Beth Drewniak, Jean Utke, Mihai Anitescu, and Paul Hovland	
Using Automatic Differentiation to Study the Sensitivity of a Crop Model	59
Claire Lauvernet, Laurent Hascoët, François-Xavier Le Dimet, and Frédéric Baret	
Efficient Automatic Differentiation of Matrix Functions	71
Peder A. Olsen, Steven J. Rennie, and Vaibhava Goel	
Native Handling of Message-Passing Communication in Data-Flow Analysis	83
Valérie Pascual and Laurent Hascoët	
Increasing Memory Locality by Executing Several Model Instances Simultaneously	93
Ralf Giering and Michael Voßbeck	

Adjoint Mode Computation of Subgradients for McCormick Relaxations	103
Markus Beckers, Viktor Mosenkis, and Uwe Naumann	
Evaluating an Element of the Clarke Generalized Jacobian of a Piecewise Differentiable Function	115
Kamil A. Khan and Paul I. Barton	
The Impact of Dynamic Data Reshaping on Adjoint Code Generation for Weakly-Typed Languages Such as Matlab	127
Johannes Willkomm, Christian H. Bischof, and H. Martin Bückner	
On the Efficient Computation of Sparsity Patterns for Hessians	139
Andrea Walther	
Exploiting Sparsity in Automatic Differentiation on Multicore Architectures	151
Benjamin Letschert, Kshitij Kulshreshtha, Andrea Walther, Duc Nguyen, Assefaw Gebremedhin, and Alex Pothen	
Automatic Differentiation Through the Use of Hyper-Dual Numbers for Second Derivatives	163
Jeffrey A. Fike and Juan J. Alonso	
Connections Between Power Series Methods and Automatic Differentiation	175
David C. Carothers, Stephen K. Lucas, G. Edgar Parker, Joseph D. Rudmin, James S. Sochacki, Roger J. Thelwell, Anthony Tongen, and Paul G. Warne	
Hierarchical Algorithmic Differentiation A Case Study	187
Johannes Lotz, Uwe Naumann, and Jörn Ungermann	
Storing Versus Recomputation on Multiple DAGs	197
Heather Cole-Mullen, Andrew Lyons, and Jean Utke	
Using Directed Edge Separators to Increase Efficiency in the Determination of Jacobian Matrices via Automatic Differentiation	209
Thomas F. Coleman, Xin Xiong, and Wei Xu	
An Integer Programming Approach to Optimal Derivative Accumulation	221
Jieqiu Chen, Paul Hovland, Todd Munson, and Jean Utke	
The Relative Cost of Function and Derivative Evaluations in the CUTER Test Set	233
Torsten Bosse and Andreas Griewank	
Java Automatic Differentiation Tool Using Virtual Operator Overloading	241
Phuong Pham-Quang and Benoit Delinchant	

High-Order Uncertainty Propagation Enabled by Computational Differentiation	251
Ahmad Bani Younes, James Turner, Manoranjan Majji, and John Junkins	
Generative Programming for Automatic Differentiation	261
Marco Nehmeier	
AD in Fortran: Implementation via Preprocessor	273
Alexey Radul, Barak A. Pearlmutter, and Jeffrey Mark Siskind	
An AD-Enabled Optimization ToolBox in LabVIEW™	285
Abhishek Kr. Gupta and Shaun A. Forth	
CasADi: A Symbolic Package for Automatic Differentiation and Optimal Control	297
Joel Andersson, Johan Åkesson, and Moritz Diehl	
Efficient Expression Templates for Operator Overloading-Based Automatic Differentiation	309
Eric Phipps and Roger Pawlowski	
Computing Derivatives in a Meshless Simulation Using Permutations in ADOL-C	321
Kshitij Kulshreshtha and Jan Marburger	
Lazy K-Way Linear Combination Kernels for Efficient Runtime Sparse Jacobian Matrix Evaluations in C++	333
Rami M. Younis and Hamdi A. Tchelepi	
Implementation of Partial Separability in a Source-to-Source Transformation AD Tool	343
Sri Hari Krishna Narayanan, Boyana Norris, Paul Hovland, and Assefaw Gebremedhin	

Recent Advances in Algorithmic Differentiation

Forth, S.; Hovland, P.; Phipps, E.; Utke, J.; Walther, A.
(Eds.)

2012, XVIII, 362 p., Hardcover

ISBN: 978-3-642-30022-6