

# Research Papers in Computer Science

EGON BÖRGER

## 1 Research Papers in Computing

1. Börger E., **A logical operational semantics for full Prolog. Part I: Selection core and control.**  
in: *CSL'89. 3rd Workshop on Computer Science Logic* (E.Börger, H.Kleine Büning, M.M. Richter, Eds). Springer LNCS, vol. 440, 1990, pp. 36-64.  
= IBM Germany IWBS Report 111, March 1990.  
Reprinted in: *Proceedings of The 3rd Logic Programming Winter School and Seminar. LOP'91*, Ruprechtov, Czechoslovakia, pp.65-94.
2. Börger E., **A logical operational semantics for full Prolog. Part II: Built-in predicates for database manipulations.**  
in: *MFCS'90. Mathematical Foundations of Computer Science* (B.Rovan, Ed.). Springer LNCS, vol. 452, 1990, pp 1-14.  
= IBM Germany IWBS Report 115, April 1990.  
Reprinted in: E.Börger, K.Dässler (eds.): *PROLOG. DIN papers for discussion*. ISO/IEC JTC1 SC22 WG17 report no.58, National Physical Laboratory, Middlesex, April 1990, pp.92-114.
3. Börger E., **A logical operational semantics for full Prolog. Part III: Built-in predicates for files, terms, arithmetic and input-output.**  
in: *Logic from Computer Science* (Y.Moschovakis, Ed.). Berkeley Mathematical Sciences Research Institute Publications, vol.21, Springer 1992, pp. 17-50.  
Preliminary version: IBM Germany IWBS Report 115, April 1990.
4. Börger E., Rosenzweig D., **From Prolog Algebras towards WAM—A Mathematical Study of Implementation.**  
in: *Computer Science Logic* (E.Börger, H.Kleine Büning, M.M. Richter, W.Schönfeld, Eds). Springer LNCS vol. 533, 1991, pp. 31-66.
5. Börger E., Schmitt P., **A formal operational semantics for languages of type Prolog III.**  
in: *Computer Science Logic* (E.Börger, H.Kleine Büning, M.M. Richter, W.Schönfeld, Eds). Springer LNCS 533, 1991, pp. 67-79.  
Preliminary version: IBM Germany, IWBS Report 144, November 1990, pp.1-27.

6. Börger E., Rosenzweig D., **WAM Algebras—A Mathematical Study of Implementation. Part II.**  
in: *Logic Programming* (A.Voronkov, Ed.). Springer LNCS 592, 1992, pp. 35-54.  
Preliminary version: Technical Report CSE-TR-88-91, Computer Science and Engineering Division, Department of Electrical Engineering and Computer Science, University of Michigan/Ann Arbor, April 1991, pp.21.
7. Börger E., Demoen B., **A Framework to Specify Database Update Views for Prolog.**  
in: *PLILP'91. Third International Symposium on Programming Languages Implementation and Logic Programming* (J.Maluszynski, M.Wirsing, Eds.). Springer LNCS 528, 1991, pp. 147-158.  
Preliminary version *The view on database updates in Standard Prolog: a proposal and a rationale* in: ISO/IEC JTC1 SC22 WG17 Prolog Standardization Report no.74, February 1991, pp. 3-10
8. Börger E., Rosenzweig D., **An Analysis of Prolog Database Views and Their Uniform Implementation.**  
in: *Prolog. Paris Papers-2*. ISO/IEC JTC1 SC22 WG17 Prolog Standardization Report no.80, July 1991, pp. 87-130.  
= Technical Report CSE-TR-89-91, Computer Science and Engineering Division, Department of Electrical engineering and Computer Science, University of Michigan/Ann Arbor, April 1991, pp.44.
9. Börger E., Rosenzweig D., **Prolog Tree Algebras. A formal specification of Prolog.**  
in: *Proceedings of the Third International Conference on Information Technology Interfaces* (V.Ceric, V.Dobric, V.Luzar, R.Paul, eds.), SRCE, Zagreb 1991, pp.513-518  
cf. *A natural formalization of full Prolog.* in: Newsletter of the Association for Logic Programming, Short Communications, vol.5/1, February 1992, pg.8-9
10. Börger E., Riccobene E., **Logical Operational Semantics of Parlog. Part I: And-Parallelism**  
in: *Processing Declarative Knowledge* (H.Boley, M.M. Richter, Eds.). Springer LNCS, vol. 567, 1992, pp.191-198.
11. Börger E., Riccobene E., **Logical Operational Semantics of Parlog. Part II: Or-Parallelism**  
in: *Logic Programming*(A.Voronkov, Ed.), Springer LNCS, vol. 592, 1992, pp.27-34.
12. Beierle C., Börger E., **Correctness proof for the WAM with types.**  
in: *Computer Science Logic* 1992 (E.Börger, H.Kleine Büning, G.Jäger, M. M.

- Richter, Eds.). Springer LNCS, vol.626, 1992, pp.15-34  
 =IBM Germany IWBS Report 205, January 1992, pp.23.
13. Börger E., Rosenzweig D., **The Mathematics of Set Predicates in Prolog.**  
 in: *Computational Logic and Proof Theory* (Georg Gottlob, Alexander Leitsch, Daniele Mundici, Eds.), Proceedings of the Third Kurt Gödel Colloquium, KGC'93. Springer LNCS, vol. 713, 1993, pp.1-13  
 = *Prolog. Copenhagen papers 2*, ISO/IEC JTC1 SC22 WG17 Standardization report no.105, National Physical Laboratory, Middlesex, 1993, pp.33-42.
  14. Börger E., Riccobene E., **A Formal Specification of Parlog.**  
 in: *Semantics of Programming Languages and Model Theory* (M. Droste, Y. Gurevich, Eds.), Gordon and Breach, 1993, pp.1-42.  
 = TR - 1/93, Dip. di Informatica, Università di Pisa, pp.42.  
 cf. **A mathematical model of Concurrent Prolog.** Research report CSTR-92-15, Dept. of Computer Science, University of Bristol, Bristol, 1992.
  15. Börger E., Riccobene E., **Logic + Control revisited: an abstract interpreter for Gödel programs.**  
 in: G.Levi (Ed.), *Advances in Logic Programming Theory*, Oxford University Press, 1994, pp. 231–254.
  16. Börger E., Rosenzweig D., **A Mathematical Definition of Full Prolog.**  
 in: *Science of Computer Programming* 24 (1995) 249–286.  
 Preliminary version: TR-33/92, Dip. di Informatica, Università di Pisa, pp.I+23.  
 See *Full Prolog in a Nutshell*. In: *Logic Programming* (Proceedings of the 10th International Conference on Logic Programming) (D.S.Warren, Ed.), MIT Press 1993, pg.832.
  17. Börger E., **Logic Programming: The Evolving Algebra Approach.**  
 In: B. Pehrson and I. Simon (Eds.) *IFIP 13th World Computer Congress 1994*, Volume I: *Technology/Foundations*, pp.391-395, 1994, Elsevier, Amsterdam.
  18. Börger E., Del Castillo G., Glavan P., Rosenzweig D., **Towards A Mathematical Specification of the APE100 Architecture: the APESE Model.** in:  
 B. Pehrson and I. Simon (Eds.) *IFIP 13th World Computer Congress 1994*, Volume I: *Technology/Foundations*, pp. 396-401, 1994, Elsevier, Amsterdam.
  19. Börger E., Glässer U., **A Formal Specification of the PVM Architecture.**  
 in: B. Pehrson and I. Simon (Eds.) *IFIP 13th World Computer Congress 1994*, Volume I: *Technology/Foundations*, pp. 402-409, 1994, Elsevier, Amsterdam.  
 Revised and extended version: **Modelling and analysis of distributed and reactive systems using evolving algebras** in: Yuri Gurevich and Egon Börger, "Evolving Algebras. Mini-Course", Technical Report BRICS-NS-95-4, BRICS, University of Aarhus, July 1995, pp.128–152.

20. Börger E., Lopez-Fraguas F.J., Rodrigues-Artalejo M., **A Model for Mathematical Analysis of Functional Logic Programs and their Implementations.**  
in: B. Pehrson and I. Simon (Eds.) *IFIP 13th World Computer Congress 1994*, Volume I: *Technology/Foundations*, pp.410-415, 1994, Elsevier, Amsterdam.  
Full version: *Towards a Mathematical Specification of Narrowing Machines*, Research Report DIA 94/5, Dep. Informática y Automática, Universidad Complutense, Madrid, March 1994, pp.30.
21. Börger E., Glässer U., Müller W., **The Semantics of Behavioral VHDL'93 Descriptions.**  
In: EURO-DAC'94 European Design Automation Conference with EURO-VHDL'94. Proceedings IEEE CS Press, Los Alamitos, CA, 1994, pp.500-505.
22. Börger E., Durdanovic I., Rosenzweig D., **Occam: Specification and Compiler Correctness. Part I: Simple Mathematical Interpreters.**  
In: E.-R. Olderog (Ed.), Proc. PROCOMET'94 (IFIP Working Conference on Programming Concepts, Methods and Calculi), pages 489-508, North-Holland, 1994
23. Börger E., Salamone R., **CLAM Specification for Provably Correct Compilation of CLP(R) Programs.**  
In: *Specification and Validation Methods* (E.Börger, Ed.), Oxford University Press, pages 97–130, 1995
24. Börger E., Gurevich Y., Rosenzweig D., **The Bakery Algorithm: Yet Another Specification and Verification.**  
In: *Specification and Validation Methods* (E.Börger, Ed.), Oxford University Press, pages 231–243, 1995  
Reprinted in: Yuri Gurevich and Egon Börger, "Evolving Algebras. Mini-Course", Technical Report BRICS-NS-95-4, BRICS, University of Aarhus, July 1995, pp.116–127.
25. Börger E., Glässer U., Müller W., **Formal Definition of an Abstract VHDL'93 Simulator by EA-Machines.**  
In: Carlos Delgado Kloos and Peter T. Breuer (Eds.), *Formal Semantics for VHDL*, pp.107–139, Kluwer Academic Publishers, 1995
26. Börger E., Rosenzweig D., **The WAM - Definition and Compiler Correctness.**  
In: *Logic Programming: Formal Methods and Practical Applications* (C.Beierle, L.Plümer, Eds.), Elsevier Science B.V./North-Holland, Series in Computer Science and Artificial Intelligence, 1995, pp. 20–90 (chapter 2).  
Preliminary version: TR-14/92, Dipartimento di Informatica, Università di Pisa, pp.I+57

27. Börger E., **Why use evolving algebras for hardware and software engineering.**  
 in: M.Bartosek, J.Staudek, J.Wiedermann (Eds), SOFSEM'95 22nd Seminar on Current Trends in Theory and Practice of Informatics.  
 Springer Lecture Notes In Computer Science, vol. 1012, 1995, pp.236–271.
28. Börger E., Del Castillo G., **A formal method for provably correct composition of a real-life processor out of basic components (The APE100 reverse engineering project).**  
 in: Proc. First IEEE International Conference on *Engineering of Complex Computer Systems* (ICECCS'95). IEEE Computer Society Press, Los Alamitos, California, 1995, pp.145-148. (The paper received the best application award.)  
 Extended version in: Yuri Gurevich and Egon Börger, "Evolving Algebras. Mini-Course", Technical Report BRICS-NS-95-4, BRICS, University of Aarhus, July 1995, pp.195–222.
29. Börger E., Durdanovic I., **Correctness of Compiling Occam to Transputer Code.**  
 in: The Computer Journal, Vol. 39, No.1, pp.52-92, 1996.  
 Preliminary version in: Yuri Gurevich and Egon Börger, "Evolving Algebras. Mini-Course", Technical Report BRICS-NS-95-4, BRICS, University of Aarhus, July 1995, pp.153–194.
30. Beierle C., Börger E., **Specification and correctness proof of a WAM extension with abstract type constraints.**  
 in: *Formal Aspects of Computing* Vol. 8(4), 1996, 428–462.  
 Preliminary version in Part 1 of IBM Germany IWBS Report 200, December 1991, pp.79.
31. Beierle C., Börger E., **Refinement of a typed WAM extension by polymorphic order-sorted types.**  
 in: *Formal Aspects of Computing* Vol. 8(5), 1996, 539–564.  
 Preliminary version in Part 2 of IBM Germany IWBS Report 200, December 1991, pp.79.
32. Beierle C., Börger E., Durdanovic I., Glässer U., Riccobene E., **Refining abstract machine specifications of the steam boiler control to well documented executable code.**  
 in: J.-R. Abrial, E.Börger, H. Langmaack (Eds.): *Formal Methods for Industrial Applications. Specifying and Programming the Steam-Boiler Control*  
 Springer LNCS State-of-the-Art Survey, vol. 1165, 1996, 52-78.  
 See <http://dx.doi.org/10.1007/BFb0027231>
33. Börger E., Mazzanti S., **A Practical Method for Rigorously Controllable Hardware Design.**

in: Bowen, J.P., Hinchey, M.G., Till, D. (eds), ZUM'97: The Z Formal Specification Notation, Springer LNCS 1212 (1997), 151-187.

See <http://dx.doi.org/10.1007/BFb0027289>. Preliminary version appeared under the title *A correctness proof for pipelining in RISC architectures* as DIMACS TR 96-22, July 1996, pp.1-60.

34. Börger E., Busch H., Cuellar J., Päppinghaus P., Tiden E., Wildgruber I., **Konzept einer hierarchischen Erweiterung von EURIS.**  
in: Siemens ZFE T SE 1, BBCPTW91-1, 1996, pp. 1-43.
35. Börger E., Schmitt P., **A description of the Tableau Method using Abstract State Machines.** in: Journal of Logic and Computation, Volume 7, number 5, 1997, pp. 661–683.
36. Börger E., Mearelli L., **Integrating ASMs into the Software Development Life Cycle.**  
in: Journal of Universal Computer Science, Special ASM Issue, 3.5 (1997), 603-665.
37. Börger E., Schulte W., **Programmer friendly modular definition of the semantics of Java.**  
in: Jim Alves-Foss (Ed.): Formal Syntax and Semantics of Java, Springer LNCS 1523, 353 – 404, 1999. Extended Abstract in: R. Berghammer and F.Simon (Eds.): Programming Languages and Fundamentals of Programming, University of Kiel (Germany) TR 9717, 1997, pp.175-181.
38. Börger E., Schulte W., **Defining the Java Virtual Machine as Platform for Provably Correct Java Compilation.**  
in: L. Brim, J. Gruska, J. Zlatuska (Eds.): Proc. MFCS'98. Springer LNCS 1450, 17–35, 1998. Online at <http://dx.doi.org/10.1007/BFb0055755>
39. Börger E., **High Level System Design and Analysis using Abstract State Machines.**  
in: Hutter, D., Stephan, W., Traverso, P., Ullmann, M. (eds): Current Trends in Applied Formal Methods (FM-Trends 98). Lecture Notes in Computer Science, Vol. 1641, pp. 1-43. Springer-Verlag, Berlin Heidelberg New York (1999)
40. Börger E., Schulte W., **Initialization Problems for Java.**  
in: *Software—Concepts and Tools*. Vol. 19, No. 4, 175-178, 2000. Issn: 0945-8115
41. Börger E., Schulte W., **Modular Design for the Java Virtual Machine Architecture.**  
in: E. Börger (Ed.): *Architecture Design and Validation Methods*. Springer Verlag 2000, pp.297–357.

42. E. Börger, A. Cavarra, E. Riccobene, **An ASM Semantics for UML Activity Diagrams.**  
In: T.Rust (Ed.), *Algebraic Methodology and Software Technology*, Proc. AMAST 2000, Lecture Notes in Computer Science, Vol.1816, Springer-Verlag, Berlin Heidelberg New York, pp.292-308, 2000
43. Börger E., Schulte W., **A Practical Method for Specification and Analysis of Exception Handling – A Java/JVM Case Study.**  
IEEE Transactions of Software Engineering, Vol.26, No.10, October 2000, pp.872–887 (Special Issue on Exception Handling, eds. D. Perry, A. Romanovsky, A. Tripathi.)
44. E. Börger, Peter Päppinghaus, J.Schmid, **Report on a Practical Application of ASMs in Software Design.**  
Abstract State Machines. Theory and Applications. International Workshop on Abstract State Machines ASM'2000. Springer LNCS 1912, 361-366, 2000
45. M. Barnett, E. Börger, Y. Gurevich, W. Schulte, M. Veanes, **Using Abstract State Machines at Microsoft: A Case Study.**  
Abstract State Machines. Theory and Applications. Proc. International Workshop on Abstract State Machines ASM'2000. Springer LNCS 1912, 367-379, 2000
46. E. Börger, **Abstract State Machines at the Cusp of the Millenium**  
Abstract State Machines. Theory and Applications. Proc.International Workshop on Abstract State Machines ASM'2000. Springer LNCS 1912, 1-8, 2000
47. E. Börger, A. Cavarra, E. Riccobene, **Modeling the Dynamics of UML State Machines.**  
Abstract State Machines. Theory and Applications. International Workshop on Abstract State Machines ASM'2000. Springer LNCS 1912, 223-241, 2000
48. E. Börger, J.Schmid, **Composition and Submachine Concepts for Sequential ASMs.**  
In: P. Clote and H. Schwichtenberg (Eds): Computer Science Logic 2000. Proc. 14th International Workshop CSL. Springer LNCS 1862, 2000, pp.41-60
49. E. Börger, E. Riccobene, J.Schmid, **Capturing Requirements by Abstract State Machines: The Light Control Case Study.** Journal of Universal Computer Science vol.6, no.7 (2000), 597-620.
50. E. Börger, **Design for Reuse via Structuring Techniques for ASMs.**  
In: Roberto Moreno-Diaz, Bruno Buchberger, Jose-Luis Freire (Eds.): Computer Aided Systems Theory - EUROCAST 2001  
Springer LNCS 2178, 2001, ISSN 0302-9743, ISBN 3- 540-42959-X Springer - Verlag Berlin Heidelberg New York, pp.20-35. Electronically available at [http://dx.doi.org/10.1007/3-540-45654-6\\_2](http://dx.doi.org/10.1007/3-540-45654-6_2).

51. E. Börger, **Discrete Systems Modeling.**  
The Encyclopedia of Physical Science and Technology, Third Edition, R.A. Meyers Ed, Academic Press, San Diego, 2001, Volume 4, pp. 535-546.
52. E. Börger, D. Sona, **A Neural Abstract Machine.**  
Journal of Universal Computer Science, Vol.7, No.11, 2001, pp. 1006-1023
53. E. Börger, A. Cavarra, E. Riccobene, **Solving Conflicts in UML State Machine Concurrent States.**  
Workshop on Concurrency Issues in UML (CIUML) at UML'2001, Toronto 2.10.2001. Position Paper, pp.4.  
See <http://wooddes.intranet.gr/uml2001/Contributions.htm>
54. E. Börger, **The Origins and the Development of the ASM Method for High Level System Design and Analysis.**  
Journal of Universal Computer Science, Vol.8, No.1, 2002, pp.2-74, ISSN 0948-695x, Online edition ISSN 0948-6968 at <http://www.jucs.org>
55. E. Börger, A. Cavarra, E. Riccobene, **A precise semantics of UML state machines: making semantic variation points and ambiguities explicit.**  
Proc. of *Semantic Foundations of Engineering Design Languages* (SFEDL'02), Satellite Workshop of ETAPS 2002, April 2002.
56. E. Börger, **Computation and Specification Models. A Comparative Study.**  
Proc. Workshop on Action Semantics (FLOC'02), BRICS Series NS-02-08 at University of Aarhus, pages 107-130, 2002.
57. E. Börger, T. Bolognesi, **Remarks on Turbo ASMs for Functional Equations and Recursion Schemes**  
In: E. Börger, A. Gargantini, E. Riccobene (Eds.): Abstract State Machines 2003—Advances in Theory and Applications  
Springer LNCS 2589, 2003, Springer - Verlag Berlin Heidelberg New York, pp. 218-228.
58. T. Bolognesi, E. Börger, **Abstract State Processes**  
In: E. Börger, A. Gargantini, E. Riccobene (Eds.): Abstract State Machines 2003—Advances in Theory and Applications  
Springer LNCS 2589, 2003, pp.22-32, Springer - Verlag Berlin Heidelberg New York.
59. E. Börger, A. Cavarra, E. Riccobene, **Modeling the meaning of transitions from and to concurrent states in UML State Machines.**  
Proc. 18th Annual ACM Symposium on Applied Computing, SAC 2003, Track Software Engineering: Applications, Practices, and Tools, March 9-12, 2003, Melbourne/Florida, USA. pp.1086-1091.  
See <http://www.acm.org/conferences/sac/sac2003/>



60. E. Börger, **The ASM Refinement Method.**  
Formal Aspects of Computing, ISSN 0934-5043, 15:237-257, 2003.
61. E. Börger, A. Cavarra, E. Riccobene, **On formalizing UML state machines using ASMs.**  
*Information and Software Technology.* Vol.46, Issue 5, pp.287-292, April 2004, ISSN 0950-5849.  
Special Issue on Software Engineering, Applications, Practices and Tools from the ACM Symposium on Applied Computing 2003 – Edited by H. Thompson, C. Chiang, I. El-Far, S. Gruner, M. Montigel, J. Whittaker.  
See <http://authors.elsevier.com/sd/article/S0950584903002027>
62. E. Börger, **The ASM Ground Model Method as a Foundation for Requirements Engineering.**  
in: N. Dershowitz (Ed.): Verification: Theory and Practice. Springer LNCS vol. 2772 (ISBN 3-540-21002-4, ISSN 0302-9743), 2004, pp.146-161.  
See <http://www.springeronline.com/cgi/cda/frontpage/0,10735,5-40109-22-26872422-0,00.html>
63. E. Börger, **Linking architectural and component level system views by Abstract State Machines.**  
Chapter 16 (pages 247-269) of: Christoph Grimm (Ed.), *Languages for System Specification and Verification*, CHDL Series, Kluwer, Boston, ISBN 1-4020-7990-7, 2004
64. R. Stärk, E. Börger, **An ASM specification of C# threads and the .NET memory model.** Proc. ASM'04, Springer LNCS 3052 (2004) pp. 38-60
65. E. Börger, **A practice-oriented course on the principles of computation, programming and system design and analysis.**  
In: C. N. Dean and R. T. Boute (Eds): Teaching Formal Methods. Springer LNCS 3294 (2004), pp. 65-84. ISBN 3-540-23611-2.
66. E. Börger, R. Stärk, **Exploiting the "A" in Abstract State Machines for Specification Reuse. A Java/C# Case Study.**  
In: F. S. de Boer, M. M. Bonsangue, S. Graf, W-P de Roever (Eds.): Formal Methods for Components and Objects. Second International Symposium FMCO 2003, Springer LNCS 3188 (2004) 42-76. ISBN 3-540-22942-6
67. E. Börger, **Abstract State Machines: A Unifying View of Models of Computation and of System Design Frameworks.**  
*Annals of Pure and Applied Logic* vol.133, 2005, pp. 149-171.
68. E. Börger, G. Fruja, V. Gervasi, R. Stärk, **A High-Level Modular Definition of the Semantics of C#.**  
*Theoretical Computer Science* 336 (2005) 235–284

69. M. Altenhofen, E. Börger, J. Lemcke, **An Abstract Model for Process Mediation**.  
In: K.-K.Lau and R. Banach (Eds): Formal Methods and Software Engineering. Proc. 7th International Conference on Formal Engineering Methods (ICFEM 2005). Springer LNCS 3785, 2005, pp. 81-95.
70. M. Barros, E. Börger, **A Compositional Framework for Service Interaction Patterns and Interaction Flows**.  
Invited paper in: K.-K. Lau and R. Banach (Eds): Formal Methods and Software Engineering. Proc. 7th International Conference on Formal Engineering Methods (ICFEM 2005). Springer LNCS 3785 (2005), pp. 5-35, ISSN 0302-9743.
71. E. Börger, **The ASM Method for System Design and Analysis. A Tutorial Introduction**.  
In: B. Gramlich (Ed.): Frontiers of Combining Systems. Springer LNAI Vol. 3717 (2005), pp. 264-283, Springer.
72. E. Börger, **Design Pattern Abstractions and Abstract State Machines**.  
D. Beauquier and E. Börger and A. Slissenko (Eds): Proc. ASM05, Université de Paris 12, 2005, pp.91-100, <http://lacl.u-pec.fr//dima/asm05/asm05-contents.html>
73. N. G. Fruja, E. Börger, **Analysis of the .NET CLR Exception Handling**.  
In: V. Skala and P. Nienaltowski (Eds.): Proc. 3rd International Conference on .NET Technologies, Pilsen, Czech Republic, May-June 2005, pp.65-75.
74. M. Altenhofen, E. Börger, J. Lemcke, **An Execution Semantics for Mediation Patterns**.  
Christoph Bussler and Dieter Fensel and Uwe Keller and Brahmanada Sapkota (Eds.): Proc. of 2nd WSMO Implementation Workshop WIW'2005, 2005, Innsbruck, Austria, ISSN 1613-0073, online CEUR-WS.org/Vol-134/lemcke-wiw05.pdf
75. M. Altenhofen, E. Börger, J. Lemcke, **A High-Level Specification for Mediators (Virtual Providers)**.  
In: Christoph Bussler, Armin Haller (Eds): Business Process Management Workshops: BPM 2005 International Workshops, BPI, BPD, ENEI, BPRM, WSCOBPM, BPS, Nancy, France, September 5, 2005. Revised Selected Papers. ISBN: 3-540-32595-6, ISSN: 0302-9743. Springer LNCS 3812, 2006, pp. 116 - 129. [http://dx.doi.org/10.1007/11678564\\_11](http://dx.doi.org/10.1007/11678564_11).
76. N. G. Fruja, E. Börger, **Modeling the .NET CLR Exception Handling Mechanism for a Mathematical Analysis**.  
In: *Journal of Object Technology*, vol.5 , no.3, 5-34, 2006, Special issue: .NET Technologies 2005 Conference,  
<http://www.jot.fm/issues/issue.2006.04/article1>

77. E. Börger, A. Gargantini, E. Riccobene, **Abstract State Machines. A Method for System Specification and Analysis.**  
In: H. Habrias and M. Frappier (Eds): *Software Specification Methods: An Overview Using a Case Study*. Hermes Science Publishing, 2006, ISBN 1905209347, pp.103-119
78. A. Friesen, E. Börger, **A High-Level Specification for Semantic Web Service Discovery Services.**  
SMIWEP-MATeS'06 (Joint Workshop on Web Services Modeling and Implementation using Sound Web Engineering Practices and Methods, Architectures and Technologies for e-Service Engineering), Workshop Proceedings of the 6th International Conference on Web Engineering, July 11-14, Palo Alto, California, USA
79. M. Altenhofen, A. Friesen, J. Lemcke, E. Börger, **A High-Level Specification for Virtual Providers.**  
International Journal of Business Process Integration and Management (IJBPIIM) Vol.1, Issue 4, December 2006, 267-278. ISSN (Online): 1741-8771, ISSN (Print): 1741-8763.
80. E. Börger, **Construction and Analysis of Ground Models and their Refinements as a Foundation for Validating Computer Based Systems.**  
Formal Aspects of Computing (2007) 19: 225-241
81. E. Börger, **Linking the Meaning of Programs to What the Compiler Can Verify.**  
In: B. Meyer and J. Woodcock (Eds): *Verified Software: Theories, Tools, Experiments*. Springer LNCS 4171 (2008), Proc. First IFIP TC 2/WG 2.3 Conference, VSTTE 2005, Zürich, Switzerland, October 10-13, 2005. pp.325-336. Draft available online at <http://vstte.ethz.ch/papers.html>. ISSN 0302-9743 (Print) 1611-3349 (Online), DOI 10.1007/978-3-540-69149-5, ISBN 978-3-540-69147-1.
82. E. Börger, **Modeling Workflow Patterns from First Principles.**  
ER 2007. Proceedings 26th International Conference on Conceptual Modeling, Auckland, New Zealand, Ed. C. Parent, K.-D. Schewe, and V. C. Storey, Springer LNCS 4801 (ISSN 0302-9743, ISBN-10: 3-540-75562-4, ISBN-13 = 978-3-540-75562-3), pp.1-20, 2007. Preliminary version *A Critical Analysis of Workflow Patterns in: Local Proc. ASM'07*, Agder University College, Norway, June 7-9, 2007.
83. D. Batory, E. Börger, **Modularizing Theorems for Software Product Lines: The Jbook Case Study.**  
Journal of Universal Computer Science 14(12), 2008, pp. 2059-2082. ISSN 0948-695x, Online edition ISSN 0948-6968. Extended abstract *Coupling Design and Verification in Software Product Lines of FoIKS 2008* Keynote in: S. Hartmann and G. Kern-Isberner (Eds): *Foundations of Information and*

- Knowledge Systems (FoIKS 2008), Springer LNCS 4932, p.1–4, 2008. See [http://dx.doi.org/10.1007/978-3-540-77684-0\\_1](http://dx.doi.org/10.1007/978-3-540-77684-0_1). DOI 10.1007/978-3-540-77684-0, ISBN 978-3-540-77683-3, ISSN 0302-9743 (Print) 1611-3349 (Online).
84. E. Börger, B. Thalheim, **Modeling Workflows, Interaction Patterns, Web Services and Business Processes: The ASM-Based Approach**  
In: ABZ 2008, Springer LNCS 5238, pp. 24-38. ISSN 0302-9743 (Print) 1611-3349 (Online), DOI 10.1007/978-3-540-87603-8
  85. E. Börger, B. Thalheim, **A Method for Verifiable and Validatable Business Process Modeling**.  
In: Advances in Software Engineering, Springer LNCS 5316, pp. 59-115, 2008. ISSN 0302-9743 (Print) 1611-3349 (Online), DOI 10.1007/978-3-540-89762-0, ISBN 978-3-540-89761-3.
  86. E. Börger, O. Soerensen, B. Thalheim, **On defining the behavior of OR-joins in business process models**  
J. Universal Computer Science, Vol. 15, No. 1, pp. 3-32, 2009, URL [http://www.jucs.org/jucs\\_15\\_1/on\\_defining\\_the\\_behavior](http://www.jucs.org/jucs_15_1/on_defining_the_behavior)
  87. M. Altenhofen, E. Börger, **Concurrent Abstract State Machines and +CAL**.  
In: A. Corradini and U. Montanari (Eds.): Recent Trends in Algebraic Development Techniques (WADT 2008), Springer LNCS 5486, pp. 1 - 17, 2009, 0302-9743 (Print) 1611-3349 (Online), DOI 10.1007/978-3-642-03429-9, ISBN 978-3-642-03428-2,  
cf. <http://www.springerlink.com/content/978-3-642-03428-2>
  88. E. Börger, I. Craig, **Modeling an Operating System Kernel**  
In: V. Diekert, K. Weicker, N. Weicker (Eds.): *Informatik als Dialog zwischen Theorie und Anwendung*. Festschrift für Volker Claus zum 65. Geburtstag, pp.199-216.  
Vieweg+Teubner, Reihe Wissenschaft, Wiesbaden 2009, ISBN 978-3-8348-0824-0.
  89. I. Craig, E. Börger, **Synchronous Message Passing and Semaphores: An Equivalence Proof**.  
In: M. Frappier, U. Glässer, S. Khurshid, R. Laleau, S. Reeves (Eds.): Abstract State Machines, Alloy, B and Z, Second International Conference, ABZ 2010, Orford, QC, Canada, February 22-25, 2010, Proceedings, Springer LNCS Subseries: Theoretical Computer Science and General Issues, Vol. 5977, pp. 20-33, 2010, ISBN: 978-3-642-11810-4, DOI 10.1007/978-3-642-11811-1, ISSN 0302-9743 (Print) 1611-3349 (Online).  
<http://www.springerlink.com/content/978-3-642-11810-4>
  90. E. Börger, **The Abstract State Machines Method for High-Level System Design and Analysis**.

- In: *Formal Methods: State of the Art and New Directions*, P.P. Boca, J.P. Bowen, J.I. Siddiqi (Eds), pages 79-116, Springer-Verlag London, 2010, ISBN 978-1-84882-735-6 (Print) 978-1-84882-736-3 (Online), DOI 10.1007/978-1-84882-736-3, see <http://www.springer.com/computer/programming/book/978-1-84882-735-6>
91. E. Börger, O. Sörensen, **BPMN Core Modeling Concepts: Inheritance-Based Execution Semantics**  
in: D. Embley and B. Thalheim (Eds): *Handbook of conceptual modelling*. pp.287-332. Springer-Verlag, March 2011. DOI 10.1007/978-3-642-15865-0, ISBN: 978-3-642-15864-3. Abstract in: Y. Ait-Ameur (Ed.): *Proc. AFADL 2010, LISI/ENSMA, Futuroscope, Poitiers*, p.1
  92. Daniel Grunwald, Malte Lochau, Egon Börger, Ursula Goltz, **An Abstract State Machine Model for the Generic Java Type System**.  
Informatik-Bericht Nr. 2010-02 of Technische Universität Carolo-Wilhelmina zu Braunschweig, Nov 3, 2010, pp.57.
  93. E. Börger, **A Subject-Oriented Interpreter Model for S-BPM**.  
Appendix in: A. Fleischmann, W. Schmidt, C. Stary, S. Obermeier, E. Börger: *Subjektorientiertes Prozessmanagement*, Hanser-Verlag, München, 2011 and *Subject-Oriented Business Process Management*, Springer Open Access Book, Heidelberg, 2012
  94. E. Börger, Antonio Cisternino, Vincenzo Gervasi: **Ambient Abstract State Machines with Applications**.  
in: *Journal of Computer and System Sciences* Volume 78, Issue 3 (In Commemoration of Amir Pnueli), May 2012, Pages 939959. Elsevier, Amsterdam. See <http://dx.doi.org/10.1016/j.jcss.2011.08.004>
  95. E. Börger: **Approaches to Modeling Business Processes. A Critical Analysis of BPMN, Workflow Patterns and YAWL**.  
in: *J. SOFTWARE AND SYSTEMS MODELING*, Volume 11, Issue 3 (2012), page 305-318, DOI: 10.1007/s10270-011-0214-z. ISSN: 1619-1366 (print version), ISSN: 1619-1374 (electronic version)
  96. E. Börger: **The Subject-Oriented Approach to Software Design and the Abstract State Machines Method**.  
in: A. Düsterhöft and M. Klettke and K.-D. Schewe (Eds.): *Conceptual Modelling and Its Theoretical Foundations – Essays Dedicated to Bernhard Thalheim on the Occasion of his 60th Birthday*, LNCS 7260, pp. 52–72. Springer, Heidelberg (2012). Reprinted in: C. Stary (Ed.): *S-BPM ONE 2012, Lecture Notes in Business Information Processing* Vol. 104, pp.1–21, Springer, Heidelberg 2012
  97. E. Börger, Antonio Cisternino, Vincenzo Gervasi: **Contribution to a Rigorous Analysis of Web Application Frameworks**.

- in: J. Derrick, J. Fitzgerald, S. Gnesi, S. Kurshid, M. Leuschel, S. Reeves, E. Riccobene (Eds.): *Abstract State Machines, Alloy, B, VDM, and Z*. Springer LNCS 7316 (2012), pp. 1–20. ISSN 0302-9743, e-ISSN 1611-3349, ISBN 978-3-642-30884-0, e-ISSN 978-3-642-30885-7, DOI 10.1007/978-3-642-30885-7. Also published in J. Derrick, S. Gnesi, D. Latella, H. Treharne (Eds.): *Integrated Formal Methods*, Springer LNCS 7321, pp. 1–20. ISSN 0302-9743, e-ISSN 1611-3349, ISBN 978-3-642-30728-7, e-ISSN 978-3-642-30729-4, DOI 10.1007/978-3-642-30729-4.
98. Vincenzo Gervasi, E. Börger, Antonio Cisternino: **Modeling Web Applications Infrastructure with ASMs**. Science of Computer Programming, Volume 94, Part 2, 15 November 2014, Pages 6992. ISSN 0167-6423. Special ABZ 2012 Issue with Selected and extended papers from ABZ 2012. Guest Editors: Elvinia Riccobene and Steve Reeves, Elsevier 2014.
  99. E. Börger: **The Abstract State Machines Method for Modular Design and Analysis of Programming Languages**. Journal of Logic and Computation. Oxford University Press, Online ISSN 1465-363X - Print ISSN 0955-792X. Special Issue *Concepts and Meaning* (Leitsch Festschrift), Eds. Matthias Baaz, Agata Ciabattoni, Dov M. Gabbay, Stefan Hetzl, Daniel Weller. Advance Access on-line published December 18, 2014, pp.23
  100. E. Börger and K.-D. Schewe: **Specifying Transaction Control to Serialize Concurrent Program Execution**. in: Yamine Ait-Ameur and Klaus-Dieter Schewe (Eds): *Abstract State Machines, Alloy, B, TLA, VDM, and Z*, Springer LNCS 8477, pp. 142-157, 2014. ISBN: 978-3-662-43651-6 (Print) 978-3-662-43652-3 (Online)
  101. E. Börger and A. Fleischmann: **Abstract State Machine Nets. Closing the Gap between Business Process Models and their Implementation**. S-BPM ONE '15: Proceedings of the 7th International Conference on Subject-Oriented Business Process Management, 2015 (Invited Paper), pp.10, ACM (New York), Digital Library, ISBN: 978-1-4503-3312-2 doi:10.1145/2723839.2723840
  102. E. Börger and S. Zenzaro: **Modeling for Change via Component-Based Decomposition and ASM Refinement**. S-BPM ONE '15: Proceedings of the 7th International Conference on Subject-Oriented Business Process Management, 2015, pp.13, ACM Digital Library, ISBN: 978-1-4503-3312-2, doi:10.1145/2723839.2723854
  103. E. Börger and K.-D.Schewe: **Concurrent Abstract State Machines**. *Acta Informatica* 2016, 53 (5) 469492.  
See <http://link.springer.com/article/10.1007/s00236-015-0249-7>.

DOI 10.1007/s00236-015-0249-7. ISSN: 0001-5903 (Print) 1432-0525 (Online)  
 Listed as Notable Article in ACM 21th Annual BEST OF COMPUTING  
[www.computingreviews.com/recommend/bestof/notableitems.cfm?bestYear=2016](http://www.computingreviews.com/recommend/bestof/notableitems.cfm?bestYear=2016).

104. E. Börger and K.-D.Schewe and Qing Wang: **Serialisable Multi-Level Transformation Control: A Specification and Verification**. *Science of Computer Programming* 131 (2016) 4258. ISSN: 0167-6423
105. E. Börger: **Modeling distributed algorithms by Abstract State Machines compared to Petri Nets**. in: M. Butler et al. (Eds): ABZ 2016 (Abstract State Machines, Alloy, B, TLA, VDM, and Z), Springer LNCS 9675 (ISSN 0302-9743, ISSN electronic 1611-3349, ISBN 978-3-319-33600-8, eBook ISBN 978-3-319-33600-8), pg.3-34, 2016, DOI: 10.1007/978-3-319-33600-8.1
106. E. Börger and M. Leuschel: **A compact encoding of sequential ASMs in Event-B**. in: M. Butler et al. (Eds): ABZ 2016 (Abstract State Machines, Alloy, B, TLA, VDM, and Z), Springer LNCS 9675 (ISSN 0302-9743, ISSN electronic 1611-3349, ISBN 978-3-319-33600-8, eBook ISBN 978-3-319-33600-8), pg.119-134, DOI: 10.1007/978-3-319-33600-8.7
107. E. Börger and K.-D.Schewe: **Communicating Abstract State Machines**. *J. Universal Computer Science* 23 (2) 129–145 (February 2017).  
<http://www.jucs.org/jucs> ( ISSN 0948-695x)
108. E. Börger: **Why Programming Must be Supported by Modeling and How**. in: T. Margaria and B. Steffen (Eds): Leveraging Applications of Formal Methods, Verification and Validation. Modeling. 8th International Symposium, ISoLA 2018, Limassol, Cyprus, November 5-9, 2018, Proceedings, Part I, pg. 89-110, Springer Nature Switzerland AG, LNCS 11244. Print ISBN 978-3-030-03417-7, Online ISBN 978-3-030-03418-4. [https://doi.org/10.1007/978-3-030-03418-4\\_6](https://doi.org/10.1007/978-3-030-03418-4_6)
109. Klaus-Dieter Schewe and Andreas Prinz and Egon Börger: Concurrent Computing with Shared Replicated Memory. In: Klaus-Dieter Schewe and Neeraj Kumar Singh (Eds): Model and Data Engineering - 9th International Conference, Proceedings MEDI 2019, Toulouse, France, October 28 - 30, 2019. Springer Lecture Notes in Computer Science 11815, 219-234, 2019. DOI: 10.1007/978-3-030-32065-2\_16  
 Print ISBN 978-3-030-32064-5, Online ISBN 978-3-030-32065-2.  
<https://www.irit.fr/MEDI2019/index.html>. An extended version is available at:  
 CoRR abs/1902.04789 (2017) <http://arxiv.org/abs/1902.04789>
110. E. Börger and K.-D.Schewe: **A characterization of distributed ASMs with partial order runs**. In: A. Raschke and D. Mery and F. Houdek: Rigorous State-Based Methods. Springer LNCS 12071 (Proc. ABZ 2020), p. 7892, 2020. Print ISBN 978-3-030-48076-9, Online ISBN 978-3-030-48077-6  
[https://doi.org/10.1007/978-3-030-48077-6\\_6](https://doi.org/10.1007/978-3-030-48077-6_6)

- 111. E. Börger and K.-D.Schewe: **A Behavioral Theory of Recursive Algorithms.**  
Fundamenta Informaticae 177.1 (2020) 1-37. IOS Press. DOI 10.3233/FI-2020-1978. ISSN 0169-2968.  
A preliminary version is available at <http://arxiv.org/abs/2001.01862>.
- 112. E. Börger: **The Role of Executable Abstract Programs in Software Development and Documentation.**  
<http://arxiv.org/abs/2209.06546>
- 113. E. Börger and V.Gervasi: **A Lean Reflective Abstract State Machine Definition**  
Lecture Notes in Computer Science 11244, Springer 2024