Publications

Books and Monographs

[1] E. Auer. "Ein verifizierender Anfangswertproblemlöser in C++ zur Integration in MO-BILE". MA thesis. Gerhard Mercator Universität Gesamthochschule Duisburg, 2002.

[2] E. Auer. "SmartMOBILE: A Framework for Reliable Modeling and Simulation of Kinematics and Dynamcis of Mechanical Systems". PhD thesis. WiKu Verlag Dr. Stein: Universität Duisburg-Essen, 2007. ISBN: 978-3-86553-240-4.

[3] A. Rauh, E. Auer, E. P. Hofer, and W. Luther, eds. *Special Issue of the International Journal of Applied Mathematics and Computer Science AMCS, "Verified Methods: Applications in Medicine and Engineering"*. Vol. 19. 3. 2009.

[4] A. Rauh and E. Auer, eds. *Modeling, Design and Simulation of Systems with Uncertainties*. Mathematical Engineering. 2011.

[5] E. Auer. *Result Verification and Uncertainty Management in Engineering Applications*. Habilitation Monograph. Verlag Dr. Hut, 2014. ISBN: 978-3-8439-1708-7.

Peer reviewed journal publications

[6] E. Auer. "Interval Modeling of Dynamics for Multibody Systems". In: *J. Comput. Appl. Math.* 199 (2 Feb. 2007), pp. 251–256.

[7] E. Auer and W. Luther. "Uses of New Sensitivity and DAE Solving Methods in SMARTMOBILE for Verified Analysis of Mechanical Systems". In: *Special Issue of the International Journal of Applied Mathematics and Computer Science AMCS, "Verified Methods: Applications in Medicine and Engineering"* 19.3 (2009), pp. 455–467.

[8] A. Rauh and E. Auer. "Validated Simulation of ODEs and DAEs in VALENCIA-IVP". In: *Reliable Computing* 15 (2011), pp. 370–381.

[9] A. Rauh, E. Auer, M. Freihold, E.P. Hofer, and H. Aschemann. "Detection and Reduction of Overestimation in Guaranteed Simulations of Hamiltonian Systems with Applications in Mechanics". In: *Reliable Computing* 15 (2011), pp. 321–332.

[10] E. Auer and A. Rauh. "VERICOMP: a system to compare and assess verified IVP solvers". In: *Computing* 94.2 (Mar. 2012), pp. 163–172. ISSN: 1436-5057. DOI: `10.1007/s00607-011-0178-4`. URL: `https://doi.org/10.1007/s00607-011-0178-4`.

[11] A. Rauh, J. Kersten, E. Auer, and H. Aschemann. "Sensitivity-based Feedforward and Feedback Control for Uncertain Systems". In: *Computing* 94.2–4 (2012), pp. 357–367.

[12] A. Rauh, E. Auer, T. Dötschel, and H. Aschemann. "Verified Stability Analysis of Continuous-Time Control Systems with Bounded Parameter Uncertainties and Stochastic Disturbances". In: *Computing* 94.2–4 (2012), pp. 345–356.

[13] G. Rebner, E. Auer, and W. Luther. "A verified realization of a Dempster–Shafer based fault tree analysis". In: *Computing* 94.2 (Mar. 2012), pp. 313–324. ISSN: 1436-5057. DOI: `10.1007/s00607-011-0179-3`. URL: `https://doi.org/10.1007/s00607-011-0179-3`.

[14] E. Auer, S. Kiel, and A. Rauh. "A Verified Method for Solving Piecewise Smooth Initial Value Problems". In: *International Journal of Applied Mathematics and Computer Science* 23.4 (2013), pp. 731–747.

[15] Th. Dötschel, E. Auer, A. Rauh, and H. Aschemann. "Thermal behavior of high-temperature fuel cells: reliable parameter identification and interval-based sliding mode control". In: *Soft Computing* 17.8 (Mar. 2013), pp. 1329–1343. ISSN: 1433-7479. DOI: `10.1007/s00500-013-1003-0`. URL: `https://doi.org/10.1007/s00500-013-1003-0`.

[16]   G. Rebner, M. Beer, E. Auer, and M. Stein. "Verified stochastic methods". In: *Soft Computing* 17.8 (Aug. 2013), pp. 1415–1423. ISSN: 1433-7479. DOI: `10.1007/s00500-013-1009-7`. URL: `https://doi.org/10.1007/s00500-013-1009-7`.

[17]   A. Rauh, L. Senkel, E. Auer, and H. Aschemann. "Interval Methods for Real-Time Capable Robust Control of Solid Oxide Fuel Cell Systems". In: *Mathematics in Computer Science* 8.3 (Sept. 2014), pp. 525–542. ISSN: 1661-8289. DOI: `10.1007/s11786-014-0205-x`. URL: `https://doi.org/10.1007/s11786-014-0205-x`.

Peer reviewed conference papers

[18]   E. Auer, A. Kecskeméthy, M. Tändl, and H. Traczinski. "Interval Algorithms in Modeling of Multibody Systems". In: *Numerical Software with Result Verification LNCS 2991*. Springer, 2004, pp. 132–159.

[19]   E. Auer, E. Dyllong, W. Luther, D. Stankovic, and H. Traczinski. "Integration of Accurate Distance Algorithms into a Modeling Tool for Multibody Systems". In: *Proceedings of the 17th IMACS World congress*. Paper T2-I-73-0397. 2005.

[20]   W. Luther, G. Haßlinger, E. Auer, E. Dyllong, D. Traczinski, and H. Traczinski. "Integration of Reliable Algorithms into Modeling Software". In: *Algebraic and Numerical Algorithms and Computer-assisted Proofs. Dagstuhl Seminar Proceedings 05391*. Ed. by B. Buchberger, S. Oishi, M. Plum, and S. M. Rump. 2005.

[21]   E. Auer and W. Luther. "SmartMOBILE – An Environment for Guaranteed Multibody Modeling and Simulation". In: *ICINCO-RA (1)*. 2007, pp. 109–116.

[22]   E. Auer and W. Luther. "Validated Simulation of Kinematics and Dynamics of Multibody Systems Using Interval and Taylor Model Based Methods". In: *PAMM*. Vol. 7. 1. WILEY-VCH Verlag, 2007, pp. 1023011–1023012.

[23]   E. Auer, M. Tändl, D. Strohbach, and A. Kecskeméthy. "Toward Validating a Simplified Muscle Activation Model in SmartMOBILE". In: *Proceedings of SCAN 2006*. IEEE Computer Society, 2007.

[24]   A. Rauh, E. Auer, J. Minisini, and E. P. Hofer. "Extensions of VALENCIA-IVP for Reduction of Overestimation, for Simulation of Differential Algebraic Systems, and for Dynamical Optimization". In: *PAMM* 7.1 (2007), pp. 1023001–1023002.

[25]   A. Rauh, E. P. Hofer, and E. Auer. "VALENCIA-IVP: A Comparison with Other Initial Value Problem Solvers". In: *Proceedings of SCAN 2006*. IEEE Computer Society, 2007.

[26]   E. Auer, A. Rauh, E.P. Hofer, and W. Luther. "Validated Modeling of Mechanical Systems with SMARTMOBILE: Improvement of Performance by VALENCIA-IVP". In: *Reliable Implementation of Real Number Algorithms: Theory and Practice. Dagstuhl Seminar Proceedings 06021*. LNCS. 2008, pp. 1–27.

[27]   Ekaterina Auer and Wolfram Luther. "Numerical Verification Assessment in Computational Biomechanics". In: *Numerical Validation in Current Hardware Architectures*. Ed. by Annie Cuyt, Walter Krämer, Wolfram Luther, and Peter Markstein. Dagstuhl Seminar Proceedings 08021. Dagstuhl, Germany: Internationales Begegnungs- und Forschungszentrum für Informatik (IBFI), Schloss Dagstuhl, Germany, 2008. URL: `http://drops.dagstuhl.de/opus/volltexte/2008/1437`.

[28]   E. Auer. "Toward Verified Modelling and Simulation of Closed Loop Systems in SmartMO-BILE". In: *Progress in Industrial Mathematics at ECMI 2008*. Mathematics in Industry. Springer Verlag, 2009, pp. 577–582.

[29] E. Auer and W. Luther. "Numerical Verification Assessment in Computational Biomechanics". In: *Proc. of Dagstuhl Seminar 08021: Numerical validation in current hardware architectures - From embedded systems to high-end computational grids*. Lecture Notes in Computer Science. 2009.

[30] E. Auer and W. Luther. "SmartMOBILE and its Applications to Guaranteed Modeling and Simulation of Mechanical Systems". In: *Lecture Notes in Electrical Engineering*. Vol. 24. 2009.

[31] A. Rauh and E. Auer. "Applications of Verified DAE Solvers in Engineering". In: *Intl. Workshop on Verified Computations and Related Topics, COE Lecture Note*. Vol. 15. Karlsruhe, Germany: Kyushu University, 2009, pp. 88–96.

[32] Andreas Rauh, Ekaterina Auer, and Harald Aschemann. "Real-Time Application of Interval Methods for Robust Control of Dynamical Systems". In: *IFAC Proceedings Volumes* 42.13 (2009). 14th IFAC Conference on Methods and Models in Automation and Robotics, pp. 384 –389. ISSN: 1474-6670. DOI: `https://doi.org/10.3182/20090819-3-PL-3002.00067`. URL: `http://www.sciencedirect.com/science/article/pii/S1474667015304705`.

[33] E. Auer and A. Rauh. "Toward Definition of Systematic Criteria for the Comparison of Verified Solvers for Initial Value Problems". In: *Proceedings of PPAM 2009*. Vol. 2. LNSC 6068. 2010, pp. 408–417.

[34] E. Auer, W. Luther, G. Rebner, and Ph. Limbourg. "A Verified MATLAB Toolbox for the Dempster-Shafer Theory". In: *Proceedings of the Workshop on the Theory of Belief Functions*. 2010.

[35] Ekaterina Auer, Roger Cuypers, Eva Dyllong, Stefan Kiel, and Wolfram Luther. "Verification and Validation for Femur Prosthesis Surgery". In: *Computer-assisted proofs - tools, methods and applications*. Ed. by B. Malcolm Brown, Erich Kaltofen, Shin'ichi Oishi, and Siegfried M. Rump. Dagstuhl Seminar Proceedings 09471. Dagstuhl, Germany: Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, 2010. URL: `http://drops.dagstuhl.de/opus/volltexte/2010/2513`.

[36] A. Rauh, E. Auer, and H. Aschemann. "Development of a Quality Measure for the Characterization of Guaranteed Solution Sets to ODEs in Engineering". In: *Proc. of the 8th IFAC Symposium on Nonlinear Control Systems*. Bologna, Italy, 2010, pp. 48–53.

[37] Andreas Rauh and Ekaterina Auer. "Interval Approaches to Reliable Control of Dynamical Systems". In: *Computer-assisted proofs - tools, methods and applications*. Ed. by B. Malcolm Brown, Erich Kaltofen, Shin'ichi Oishi, and Siegfried M. Rump. Dagstuhl Seminar Proceedings 09471. Dagstuhl, Germany: Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, 2010. URL: `http://drops.dagstuhl.de/opus/volltexte/2010/2512`.

[38] E. Auer, A. Chuev, R. Cuypers, S. Kiel, and W. Luther. "Relevance of Accurate and Verified Numerical Algorithms for Verification and Validation in Biomechanics". In: *EUROMECH Colloquium 511 – Biomechanics of Human Motion Proceedings*. Ponta Delgada, Azores, Portugal, Mar. 2011.

[39] E. Auer, H. Albassam, A. Kecskeméthy, and W. Luther. "Verified Analysis of a Model for Stance Stabilization". In: *Modeling, Design and Simulation of Systems with Uncertainties*. Mathematical Engineering. 2011, pp. 294–308.

[40] E. Auer and W. Luther. "Verified Analysis of a Biomechanics-Related System". In: *Progress in Industrial Mathematics at ECMI 2010*. 2012, pp. 651–657.

[41] E. Auer, R. Cuypers, and W. Luther. "Process-oriented Approach to Verification in Engineering". In: *ICINCO (2)*. 2012, pp. 513–518.

[42]   E. Auer, S. Kiel, and A. Rauh. "Verified Parameter Identification for Solid Oxide Fuel Cells". In: *Proceeding of REC 2012*. 2012, pp. 41–55. ISBN: 978-80-214-4507-9.

[43]   A. Rauh, T. Dötschel, E. Auer, and H. Aschemann. "Interval methods for control-oriented modeling of the thermal behavior of high-temperature fuel cell stacks". In: *Proc. of 16th IFAC Symposium on System Identification SysID 2012*. Brussels, Belgium, 2012, pp. 446–451.

[44]   E. Auer, W. Luther, and R. Cuypers. "Process-oriented Verification in Biomechanics". In: *Procedings of ICOSSAR 2013: 11th International Conference on Structural Safety and Reliability*. New York, 2013, pp. 391–398.

[45]   E. Auer, A. Chuev, R. Cuypers, S. Kiel, and W. Luther. "Relevance of Accurate and Verified Numerical Algorithms for Verification and Validation in Biomechanics". In: *Safety, Reliability, Risk and Life-Cycle Performance of Structures and Infrastructures*. Ed. by George Deodatis, Bruce R. Ellingwood, and Dan M. Frangopol. London, 2013, pp. 391–398.

[46]   S. Kiel, E. Auer, and A. Rauh. "Uses of GPU Powered Interval Optimization for Parameter Identification in the Context of SO Fuel Cells". In: *Procedings of NOLCOS 2013*. 2013, pp. 558–563.

[47]   E. Auer, S. Kiel, T. Pusch, and W. Luther. "A Flexible Environment for Accurate Simulation, Optimization, and Verification of SOFC Models". In: *Proc. of ASCE-ICVRAM-ISUMA*. Liverpool, UK, 2014.