

Complete List of Scientific Publications:
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Monographs, Special Issues, Book Chapters

1. Rauh, Andreas; Hofer, Eberhard P.: *Interval Arithmetic Optimization Techniques for Uncertain Discrete-Time Systems*, Proc. of the 13th Intl. Workshop on Dynamics and Control 2005, Wiesensteinig, Germany, *Modeling and Control of Autonomous Decision Support Based Systems*, E. P. Hofer and E. Reithmeier (editors), pp. 141–148, Shaker Verlag, Aachen, 2005.
2. Minisini, Johanna; Rauh, Andreas; Hofer, Eberhard P.: *Carleman Linearization for Approximate Solutions of Nonlinear Control Problems: Part 1 – Theory*, presented at the 14th Intl. Workshop on Dynamics and Control, Moscow-Zvenigorod, Russia, *Advances in Mechanics: Dynamics and Control: Proceedings of the 14th International Workshop on Dynamics and Control*, F. L. Chernousko, G. V. Kostin, V. V. Saurin (editors), pp. 215–222, Nauka, Moscow, 2008.
3. Rauh, Andreas; Minisini, Johanna; Hofer, Eberhard P.: *Carleman Linearization for Approximate Solutions of Nonlinear Control Problems: Part 2 – Applications*, presented at the 14th Intl. Workshop on Dynamics and Control, Moscow-Zvenigorod, Russia, *Advances in Mechanics: Dynamics and Control: Proceedings of the 14th International Workshop on Dynamics and Control*, F. L. Chernousko, G. V. Kostin, V. V. Saurin (editors), pp. 266–273, Nauka, Moscow, 2008.
4. Rauh, Andreas; Hofer, Eberhard P.: *Interval Methods for Optimal Control*. In A. Frediani, G. Buttazzo (editors): Proc. of the 47th Workshop on *Variational Analysis and Aerospace Engineering*, Erice, Italy, 2007. pp. 397–418, Springer–Verlag, New York, 2009.
5. Rauh, Andreas: *Theorie und Anwendung von Intervallmethoden für Analyse und Entwurf robuster und optimaler Regelungen dynamischer Systeme*, Dissertation, Universität Ulm, Fortschritt-Berichte VDI, Reihe 8, Nr. 1148, 2008.
6. Rauh, Andreas; Auer, Ekaterina; Hofer, Eberhard P.; Luther, Wolfram (editors): *Verified Methods: Applications in Medicine and Engineering*, Special Issue of the International Journal of Applied Mathematics and Computer Science AMCS, Vol. 19, No. 3, 2009.
7. Rauh, Andreas; Auer, Ekaterina: Minisymposium on *Validated Methods: Applications to Modeling, Analysis, and Design of Systems in Medicine and Engineering*, In: A.D. Fitt, J. Norbury, H. Ockendon, and E. Wilson (Eds.), Progress in Industrial Mathematics at ECMI 2008, London, UK, pp. 547–548, Springer–Verlag, 2010.
8. Freihold, Mareile; Rauh, Andreas; Hofer, Eberhard P.: *Derivation of Physically Motivated Constraints for Efficient Interval Simulations Applied to the Analysis of Uncertain Models of Blood Cell Dynamics*, Minisymposium on *Validated Methods: Applications to Modeling, Analysis, and Design of Systems in Medicine and Engineering*, In: A.D. Fitt, J. Norbury, H. Ockendon, and E. Wilson (Eds.), Progress in Industrial Mathematics at ECMI 2008, London, UK, pp. 563–569, Springer–Verlag, 2010.
9. Rauh, Andreas; Minisini, Johanna; Hofer, Eberhard P.: *Verification Techniques for Sensitivity Analysis and Design of Controllers for Nonlinear Dynamical Systems with Uncertainties*, Minisymposium on *Validated Methods: Applications to Modeling, Analysis, and Design of Systems in Medicine and Engineering*, In: A.D. Fitt, J. Norbury, H. Ockendon, and E. Wilson (Eds.), Progress in Industrial Mathematics at ECMI 2008, London, UK, pp. 549–555, Springer–Verlag, 2010.
10. Rauh, Andreas; Aschemann, Harald: *Interval Methods for Verification and Implementation of Robust Controllers*, In: J. Lévine and P. Müllhaupt (Eds.), *Advances in the Theory of Control, Signals and Systems, with Physical Modelling*, Lecture Notes in Control and Information Sciences Series, vol. 407, (Series Editors: M. Thoma, F. Allgöwer, M. Morari), pp. 201–211, Springer–Verlag, 2011.
11. Leska, Maik; Prabel, Robert; Rauh, Andreas; Aschemann, Harald: *Simulation and Optimization of the Longitudinal Dynamics of Parallel Hybrid Railway Vehicles*, Proc. of FORMS/FORMAT-2010, Braunschweig, Germany, Part 2, E. Schnieder and G. Tarnai (eds.), pp. 155–164, vol. 281, Springer–

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 14. Saurin, Vasily V.; Kostin, Georgy V.; Rauh, Andreas; Aschemann, Harald: *Adaptive Control Strategy in Heat Transfer Problems with System Parameter Uncertainties Based on a Projective Approach*, In: A. Rauh and E. Auer (Eds.), *Modeling, Design, and Simulation of Systems with Uncertainties*, Mathematical Engineering, (Series Editors: C. Hillermeier, J. Huber, S. Schäffler, A. Gilg), pp. 309–332, Springer-Verlag, 2011.
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 17. Rauh, Andreas; Senkel, Luise: *Variable-Structure Approaches for Analysis, Simulation, Robust Control and Estimation of Uncertain Dynamic Processes*, Mathematical Engineering, (Series Editors: C. Hillermeier, J. Schröder, B. Weigand), Springer-Verlag, 2016.
 18. Rauh, Andreas; Senkel, Luise: *Interval Methods for Robust Sliding Mode Control Synthesis of High-Temperature Fuel Cells with State and Input Constraints*, In: A. Rauh and L. Senkel (Eds.), *Variable-Structure Approaches for Analysis, Simulation, Robust Control and Estimation of Uncertain Dynamic Processes*, Mathematical Engineering, (Series Editors: C. Hillermeier, J. Schröder, B. Weigand), pp. 53–85, Springer-Verlag, 2016.
 19. Senkel, Luise; Rauh, Andreas; Aschemann, Harald: *Experimental and Numerical Validation of a Reliable Sliding Mode Control Strategy Considering Uncertainty with Interval Arithmetic*, In: A. Rauh and L. Senkel (Eds.), *Variable-Structure Approaches for Analysis, Simulation, Robust Control and Estimation of Uncertain Dynamic Processes*, Mathematical Engineering, (Series Editors: C. Hillermeier, J. Schröder, B. Weigand), pp. 87–122, Springer-Verlag, 2016.
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 21. Senkel, Luise; Rauh, Andreas; Aschemann, Harald: *Experimental Validation of State and Parameter Estimation using Sliding-Mode Techniques with Bounded and Stochastic Uncertainty*, in Minisymposium on *Robust Variable-Structure Approaches for Control and Estimation of Uncertain Dynamic Processes*, In: G. Russo, V. Capasso, G. Nicosia, and V. Romano (Eds.), *Progress in Industrial Mathematics at ECMI 2014, Mathematics in Industry 22*, Taormina, Italy, pp. 659–666, Springer-Verlag, 2016.
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23. Rauh, Andreas (editor): *Algorithms for Reliable Estimation, Identification and Control*, Special Issue of the MDPI Journal Algorithms, 2020, www.mdpi.com/journal/algorithms/special_issues/reliable_estimation_identification_robust_optimal.
24. Auer, Ekaterina; Kersten, Julia; Rauh, Andreas (editors): *Special Issue of the 11th Summer Workshop on Interval Methods*, Acta Cybernetica, Vol. 24, No. 3, 2020.
25. Rauh, Andreas; Jaulin, Luc; Alexandre dit Sandretto, Julien (editors): *Algorithms for Reliable Estimation, Identification and Control II*, Special Issue of the MDPI Journal Algorithms, 2021, www.mdpi.com/journal/algorithms/special_issues/reliable_estimation_identification_robust_optimal_II.
26. Rauh, Andreas; Auer, Ekaterina; Gehan, Olivier; Tibken, Bernd (editors): *Reliable Modeling, Simulation, Identification, Control and State Estimation for Dynamic Systems with Uncertainty*, Special Issue of Frontiers in Control Engineering, 2021, www.frontiersin.org/research-topics/19749/reliable-modeling-simulation-identification-control-and-state-estimation-for-dynamic-systems-with-un.

Peer-reviewed journal publications

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3. Kletting, Marco; Rauh, Andreas; Aschemann, Harald; Hofer, Eberhard P.: *Consistency Tests in Guaranteed Simulation of Nonlinear Uncertain Systems with Application to an Activated Sludge Process*, Proc. of the 11th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic, and Validated Numerics SCAN 2004, Fukuoka, Japan, *Journal of Computational and Applied Mathematics*, Vol. 199 (2), pp. 213–219, 2007.
4. Rauh, Andreas; Kletting, Marco; Hofer, Eberhard P.: *Interval Techniques for Enclosures of Regions of Reachability and Controllability and for Guaranteed State and Parameter Estimation of Dynamical Systems*, Proc. of the 6th Intl. Congress on Industrial and Applied Mathematics, Minisymposium *Taylor Model Methods and Interval Methods – Applications*, Zurich, Switzerland, PAMM, Volume 7, Number 1, pp. 1023009–1023010, 2007.
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6. Rauh, Andreas; Brill, Michael; Günther, Clemens: *A Novel Interval Arithmetic Approach for Solving Differential-Algebraic Equations with ValEnCIA-IVP*, Special Issue of the International Journal of Applied Mathematics and Computer Science AMCS on *Verified Methods: Applications in Medicine and Engineering*, Vol. 19, No.3, pp. 381–397, 2009.
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8. Rauh, Andreas; Auer, Ekaterina; Freihold, Mareile; Hofer, Eberhard P.; Aschemann, Harald: *Detection and Reduction of Overestimation in Guaranteed Simulations of Hamiltonian Systems with Applications in Mechanics*, Special Issue of Reliable Computing, 13th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic, and Validated Numerics SCAN2008, El Paso, USA, 2008.

- Reliable Computing, Vol. 15, No. 4, pp. 321–332, 2011.
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 11. Krasnochtanova, Irina; Rauh, Andreas; Kletting, Marco; Aschemann, Harald; Hofer, Eberhard P.; Schoop, Karl-Michael: *Interval Methods as a Simulation Tool for the Dynamics of Biological Wastewater Treatment Processes with Parameter Uncertainties*, Applied Mathematical Modeling, Elsevier, Vol. 34, No. 3, pp. 744–762, 2010.
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 15. Aschemann, Harald; Minisini, Johanna; Rauh, Andreas: *Interval Arithmetic Techniques for the Design of Controllers for Nonlinear Dynamical Systems with Applications in Mechatronics – Part 2*, Izvestiya RAN. Teoriya i sistemy upravleniya (Journal of Computer and Systems Sciences International), No. 6, pp. 3–15, 2010 (Journal of Computer and Systems Sciences International, Vol. 49, No. 6, pp. 833–846, 2010).
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 19. Rauh, Andreas; Auer, Ekaterina; Dötschel, Thomas; Aschemann, Harald: *Verified Stability Analysis of Continuous-Time Control Systems with Bounded Parameter Uncertainties and Stochastic Disturbances*, Presented at 14th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic, and Validated Numerics SCAN2010, Lyon, France, 2010. Computing: Volume 94, No. 2–4, pp. 345–356, 2012.
 20. Rauh, Andreas; Aschemann, Harald: *Parameter Identification and Observer-Based Control for Distributed Heating Systems — The Basis for Temperature Control of Solid Oxide Fuel Cell Stacks*, Mathematical and Computer Modelling of Dynamical Systems, Volume 18, No. 4, pp. 329–353, 2012.

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22. Cichy, Błażej; Gałkowski, Krzysztof; Dąbkowski, Paweł; Aschemann, Harald; Rauh, Andreas: *A New Procedure for the Design of Iterative Learning Controllers using a 2D Systems Formulation of Processes with Uncertain Spatio-Temporal Dynamics*, *Control and Cybernetics*, Vol. 42, No. 1, pp. 9–26, 2013.
23. Rauh, Andreas; Butt, Saif S.; Aschemann, Harald: *Nonlinear State Observers and Extended Kalman Filters for Battery Systems*, *International Journal of Applied Mathematics and Computer Science AMCS*, Vol. 23, No. 3, pp. 539–556, 2013.
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33. Aschemann, Harald; Kostin, Georgy V.; Rauh, Andreas; Saurin, Vasily V.: *Optimal Control of a Viscoelastic Rack Feeder Based on the Method of Integrodifferential Relations*, *Izvestiya RAN. Teoriya i sistemy upravleniya (Journal of Computer and Systems Sciences International)*, No. 2, pp. 126–138, 2015 (*Journal of Computer and Systems Sciences International*, Vol. 54, No. 2, pp. 294–306, 2015).
34. Rauh, Andreas; Senkel, Luise; Aschemann, Harald: *Interval-Based Sliding Mode Control Design for Solid Oxide Fuel Cells with State and Actuator Constraints*, *IEEE Transactions on Industrial Electronics, Special Section on Modeling, diagnosis and control of fuel cell based technologies and their integration in smart grids and automotive systems*, Vol. 62, Issue 8, pp. 5208–5217, 2015.
35. Rauh, Andreas; Senkel, Luise; Aschemann, Harald; Saurin, Vasily V.; Kostin, Georgy V.: *An Integrodifferential Approach to Modeling, Control, State Estimation and Optimization for Heat Transfer Systems*, *International Journal of Applied Mathematics and Computer Science AMCS*, Vol. 26, No. 1,

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 51. Rauh, Andreas; Kersten, Julia: *From Verified Parameter Identification to the Design of Interval Observers and Cooperativity-Preserving Controllers — An Experimental Case Study*. Acta Cybernetica, Vol. 24, No. 3, pp. 509–537, 2020.

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55. Rauh, Andreas; Kersten, Julia: *Toward the Development of Iteration Procedures for the Interval-Based Simulation of Fractional-Order Systems*. Acta Cybernetica, Vol. 25, No. 1, pp. 21–48, 2021. <https://doi.org/10.14232/actacyb.285660>
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Invited talks

1. Rauh, Andreas: *Intervallmethoden für Analyse und Entwurf von Steuerungen und Regelungen — Theorie, Implementierung und Anwendungen*, Automatisierungstechnisches Kolloquium, Ruhr-Universität Bochum, Germany, April 28, 2009.
2. Rauh, Andreas: *Interval-Based Robust Control Design with State and Disturbance Estimation for Distributed Parameter Systems*, Technical University of Varna, Bulgaria, October 7, 2009.
3. Rauh, Andreas; Aschemann, Harald: *Interval Techniques for Reliable Control of Dynamical Systems with Applications to Control of Distributed Heating Systems*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, March 25, 2010.
4. Rauh, Andreas; Aschemann, Harald: *Sensitivity Analysis for the Synthesis of Open-Loop and Closed-Loop Controllers*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, September 09, 2010.
5. Rauh, Andreas; Aschemann, Harald: *An Introduction to Sensitivity Analysis for the Design of Open-*

- Loop and Closed-Loop Controllers*, Technical University of Varna, Bulgaria, September 23, 2010.
6. Rauh, Andreas: *Synthesis of Open-Loop and Closed-Loop Controllers Using Sensitivity Analysis Techniques*, Institute of Control and Computation Engineering, University of Zielona Gora, Poland, November 04, 2010.
 7. Rauh, Andreas; Aschemann, Harald: *Observer Design for State and Parameter Estimation in Distributed Heating Systems*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, March 22, 2011.
 8. Rauh, Andreas; Dittrich, Christina; Senkel, Luise; Aschemann, Harald: *Design of State and Parameter Estimation Strategies for Water Supply Systems*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, October 06, 2011.
 9. Rauh, Andreas; Senkel, Luise; Dittrich, Christina; Aschemann, Harald; Kostin, Georgy V.; Saurin, Vasily V.: *Reliable Finite-Dimensional Modeling and Control of a Distributed Heating System*, Institute of Control and Computation Engineering, University of Zielona Gora, Poland, April 19, 2012.
 10. Rauh, Andreas; Senkel, Luise; Dittrich, Christina; Aschemann, Harald: *Observer-Based Predictive Temperature Control for Distributed Heating Systems Based on the Method of Integrodifferential Relations*, Institute of Physics, University of Torun, Poland, November 08, 2012.
 11. Rauh, Andreas; Senkel, Luise; Aschemann, Harald: *Experimental Validation of Feedback Control Strategies for a Spatially Two-Dimensional Heat Transfer Process: A Comparison Between Finite Volume and Finite Element Models*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, October 01, 2013.
 12. Aschemann, Harald; Schindele, Dominik; Rauh, Andreas: *Norm-Optimal Iterative Learning Control for a Heating Rod Based on the Method of Integro-Differential Relations*, A. Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, October 01, 2013.
 13. Rauh, Andreas: *Why is Interval Analysis Useful for the Real-Time Implementation of Variable-Structure Control Laws?*, International Workshop on Enclosure Methods, Freudenstadt, Germany, 2016.
 14. Rauh, Andreas; Tiede, Susann; Klenke, Cornelia: *An Interval-Based Algorithm for Feature Extraction from Speech Signals*, Institute of Physics, University of Torun, Poland, December 02, 2016.
 15. Rauh, Andreas; Prabel, Robert; Aschemann, Harald: *Oscillation Attenuation for Crane Payloads by Controlling the Rope Length Using Extended Linearization Techniques*, Institute of Control and Computation Engineering, University of Zielona Gora, Poland, March 30, 2017.
 16. Rauh, Andreas; Kersten, Julia: *An Interval Observer-Based Branch-and-Bound Procedure for Verified Parameter Identification of Cooperative Systems*, Ishlinsky Institute for Problems in Mechanics of the Russian Academy of Sciences, Moscow, Russia, October 11, 2018.
 17. Rauh, Andreas; Kersten, Julia: *A Unified Interval Approach for Parameter Identification, State Estimation and Robust Control of Spatially Distributed Heating Systems with Uncertainty*, 5-Part Lecture Series, Université Paris-Saclay, Evry, France, March 18–21, 2019. <https://www.ibisc.univ-evry.fr/deux-seminaires-organises-a-ibisc-les-18-et-21-mars-2019-site-pelvoux-en-presence-de-andreas-rauh-et-de-julia-kersten-univ-rostock-allemande/>.
 18. Rauh, Andreas: *Exponential Enclosure Techniques for Initial Value Problems with Multiple Conjugate Complex Eigenvalues*, Halmstad University, Sweden, April 24, 2019. <https://www.youtube.com/watch?v=mhvmaw-Ptww>.
 19. Rauh, Andreas: *Fractional-Order System Models and Their Verified Numerical Analysis Using Interval Methods*, International Online Seminar on Interval Methods in Control Engineering, January 15, 2021. <http://dx.doi.org/10.13140/RG.2.2.13293.00486>.
 20. Rauh, Andreas: *Verified Parameter Identification of Quasi-Linear Cooperative System Models: A Combination of Branch-and-Bound as well as Contractor Techniques*, Computational Mathematics Seminar, Kraków, Poland (virtual), April 15, 2021. <http://dx.doi.org/10.13140/RG.2.2.31167.43687>.

Patents

[DE] *Verfahren und Anordnung sowie Computerprogramm mit Programmcode-Mitteln und Computerprogramm-Produkt zur Ermittlung einer ausgewählten Position einer mobilen Kommunikationseinrichtung in einem Kommunikationsnetz*

[EN] *Method, Configuration and Computer Program Comprising Program Code Means and Computer Program Product for Determining a Selected Position of a Mobile Communications Device within a Communications Network*

[FR] *Procédé et système ainsi que programme informatique comprenant des moyens de code de programme et produit-programme informatique pour déterminer une position sélectionnée d'un dispositif de communication mobile dans un réseau de communication*

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[US] *Method, Configuration and Computer Program Comprising Program Code Means and Computer Program Product for Determining a Selected Position of a Mobile Communications Device within a Communications Network*

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Inventors: Bamberger, Joachim; Briechle, Kai; Grigoras, Marian; Hanebeck, Uwe D.; Hoffmann, Clemens; Rauh, Andreas (in alphabetic order)