LIST OF PUBLICATIONS (2002-2022)

(see also http://scholar.google.de)

The 5 most important interdisciplinary publications in the research field „Mathematics in Natural Science“:

Lebiedz, D. Computing minimal entropy production trajectories: An approach to model reduction in chemical kinetics. J. Chem. Phys. 120, 6890 (2004)

Vladimirov, N., Løvdok, L., Lebiedz, D., Sourjik, V. Dependence of bacterial chemotaxis on gradient shape and adaptation rate. PloS Comput. Biol. 4, e1000242 (2008)

Lebiedz, D., Siehr, J. Unger, J. A Variational principle for computing slow invariant manifolds in dissipative dynamical systems. SIAM J. Sci. Comput. 33, 703 (2011)

Skanda, D., Lebiedz, D. A robust optimization approach to experimental design for model discrimination of dynamical systems. Math. Prog. 141, 405 (2013)

Heiter, P., Lebiedz, D. Towards differential geometric characterization of slow invariant manifolds in extended phase space: Sectional curvature and flow invariance. SIAM J. Appl. Dyn. Syst. 17, 732 (2018)

Diploma Theses, PhD Thesis, Habilitation Thesis

Isolierung der Promotorregion und der Splice-Varianten des monozytären cysteinreichen Scavengerrezeptors CD163 (RM3/1), Diploma Thesis Biochemistry, University of Münster, 1998

Wasserstoffinduzierte Effekte im System $Nd_2(Fe/Co)_{14}B$, Eine SIMS- und XPS-Studie, PhD Thesis Physical Chemistry, University of Münster, 2001

Numerische Simulation und Optimale Steuerung parabolischer Differentialgleichungen in Chemotaxis-Modellen, Diploma Thesis Applied Mathematics, University of Münster, 2002

Optimal Control, Model- and Complexity-Reduction of Self-Organized Chemical and Biochemical Systems: A Scientific Computing Approach, Habilitation Thesis, University of Heidelberg, 2006

Publications in Journals, Proceedings, Monographs

1. Kestenbaum, H., Lange de Oliveira, A., Schmidt, W., Schüth, F., Ehrfeld, W., Gebauer, K., Löwe, H., Richter, T., Lebiedz, D., Untiedt, I., Züchner, H. Silver catalysed oxidation of ethylene to ethylene oxide in a microreaction system. Ind. Eng. Chem. Res. 41, 710 (2002)
2. Lebiedz, D., Züchner, H., Gutfleisch, O. A secondary ion mass spectrometry study of hydrogen interaction with $Nd_2(Fe/Co)_{14}B$. J. Alloy Compd. 356-357, 679 (2003)
3. Lebiedz, D., Brandt-Pollmann, U. Manipulation of self-aggregation patterns and waves in a reaction-diffusion-system by optimal boundary control strategies. Phys. Rev. Lett. 91, 208301 (2003), selected for online-publication in Virtual Journal of Biological Physics Research 6(10) (2003)
4. Ishmurzin, A., Schramm, B., Lebiedz, D., Warnatz, J. Reduction of Detailed Reaction Mechanisms for Large Hydrocarbon Combustion by the ILDM method. In Proceedings of the European Combustion Meeting, Orleans (2003)
5. Lebiedz, D. Computing minimal entropy production trajectories: An approach to model reduction in chemical kinetics. J. Chem. Phys. 120, 6890 (2004)
6. Lebiedz, D., Züchner, H., Gutfleisch, O. Hydrogen-induced effects in alloys of type $Nd_2(Fe/Co)_{14}B$ studied by X-ray photoelectron spectroscopy. Chem. Mater. 16, 3098 (2004)
7. Lebiedz, D., Brandt-Pollmann, U. Dynamic control and information processing in chemical reaction systems by tuning self-organization behavior. Chaos 14, 611 (2004), selected for online-publication in Virtual Journal of Biological Physics Research 8(5) (2004)
8. Lebiedz, D., Brandt-Pollmann, U. Manipulation of surface reaction dynamics by global pressure and local temperature control: A model study. Phys. Rev. E 70, 051609 (2004)
9. Lebiedz, D., Maurer, H. External optimal control of self-organisation dynamics in a chemotaxis reaction diffusion system. Syst. Biol. (Stevenage) 1, 222 (2004)
10. Inderwildi, O.R., Lebiedz, D., Deutschmann, O., Warnatz, J. Coverage dependence of oxygen decomposition and surface diffusion on rhodium (111): A DFT study. J. Chem. Phys. 122, 034710 (2005)
11. Zobeley, J., Lebiedz, D., Kammerer, J., Ishmurzin, A., Kummer, U. A new time-dependent complexity reduction method for biochemical systems. Trans. Comput. Syst. Biol. 1, 90 (2005)
12. Inderwildi, O.R., Lebiedz, D., Deutschmann, O., Warnatz, J. Influence of initial oxygen coverage and magnetic moment on the NO decomposition on rhodium (111). J. Chem. Phys. 122, 15470 (2005)
13. Lebiedz, D., Brandt-Pollmann, U. Specific external forcing of spatiotemporal dynamics in reaction-diffusion systems. Chaos 15, 023901 (2005), selected for online-publication in Virtual Journal of Biological Physics Research 9(7) (2005)
14. Inderwildi, O.R., Lebiedz, D., Warnatz, J. Linear relationships between activation energies and reaction energies for coverage-dependent dissociation reactions on rhodium surfaces. Phys. Chem. Chem. Phys. 7, 2552 (2005)
15. Brandt-Pollmann, U., Lebiedz, D., Diehl, M., Sager, S., Schlöder, J.P. Real-time nonlinear feedback control of pattern formation in (bio)chemical reaction-diffusion processes: A model study. Chaos 15, 033901 (2005), selected for online-publication in Virtual Journal of Biological Physics Research 10(2) (2005)
16. Lebiedz, D., Sager, S., Bock, H.G., Lebiedz, P. Annihilation of limit-cycle oscillations by identification of critical perturbing stimuli via mixed-integer optimal control. Phys. Rev. Lett. 95, 108303 (2005), selected for online-publication in Virtual Journal of Biological Physics Research 10(6)) (2005)
17. Lebiedz, D. Exploiting optimal control for target-oriented manipulation of (bio)chemical systems: a model-based approach to specific modification of self-organized dynamics. Int. J. Mod. Phys. B 19, 3763 (2005)

18. Lebiedz, D., Kammerer, J., Brandt-Pollmann, U. Automatic network coupling analysis for dynamical systems based on detailed kinetic models. Phys. Rev. E 72, 041911 (2005), selected for online-publication in Virtual Journal of Biological Physics Research 10(8) (2006)
19. Inderwildi, O.R., Lebiedz, D., Deutschmann, O., Warnatz, J. Influence of coadsorbates on the NO dissociation on a rhodium(311) surface. ChemPhysChem 6, 2513 (2005)
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21. Shaik, O.S., Kammerer, J., Gorecki, J., Lebiedz, D. Derivation of a quantitative minimal model from a detailed elementary-step mechanism supported by mathematical coupling analysis. J. Chem. Phys. 123, 324103 (2005), selected for online-publication in Virtual Journal of Biological Physics Research 11(1) (2006)
22. Lebiedz, D., Reinhardt, V. Kammerer, J. Novel Trajectory-Based Concepts for Model and Complexity Reduction in (Bio)chemical Kinetics. p. 343 in A. Gorban et al. „Model reduction and coarse graining approaches for multi-scale phenomena. Springer (2006)
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24. Lebiedz, D. Sager, S., Shaik, O. S., Slaby, O. Optimal control of self-organized dynamics in cellular signal transduction. Proceedings of the 5th Vienna Symposium on Mathematical Modeling, Vienna, Austria, 2006, Argesim Rep. 30, ISBN 3-901608-30-3 (2006)
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32. Vladimirov, N., Løvdok, L., Lebiedz, D., Sourjik, V. Dependence of bacterial chemotaxis on gradient shape and adaptation rate. PloS Comput. Biol. 4: e1000242 (2008)
33. Lebiedz, D., Skanda, D., Fein, M. Automatic complexity analysis and model reduction of nonlinear biochemical systems. In M. Heiner and A.M. Uhrmacher eds., “Computational Methods in Systems Biology”, Lecture Notes in Computer Science, p. 123, Volume 5307 (2008)
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53. Skanda, D., Lebiedz, D. A robust optimization approach to experimental design for model discrimination of dynamical systems. Math. Prog. 141, 405 (2013)
54. Lebiedz, D., Siehr, J. A continuation method for the efficient solution of parametric optimization problems in kinetic model reduction. SIAM J. Sci. Comput. 35, A1584-A1603 (2013)

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57. Kaese S, Everding S, Bohn A, Holz E, Lieder F, Baumgart P, Lebiedz D, Fischer D, Waltenberger J, Lebiedz P. Efficacy, adverse events and outcome of pre-hospital systemic thrombolysis in out-of-hospital cardiac arrest. European Heart Journal Supplements 1 (S2), 130 (2013)
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64. Lebiedz, D., Dietrich, J., Heitel, M. Poppe, J. Analytic continuation and differential geometry views on slow manifolds and separatrices. Proceedings of 7th IWMRRF, Trondheim, Norway (2019)
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69. Lebiedz, D., Poppe, J. On differential geometric formulations of slow invariant manifold computation: Geodesic stretching and flow curvature. Journal of Dynamical Systems and Geometric Theories 20(1), 1-32 (2022)
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71. Heitel, M., Verschueren, R., Diehl, M., Lebiedz, D. Slow manifold based model reduction in multiscale chemical optimal control problems. arXiv:1712.01058 math.OC
72. Heitel, M., Lebiedz, D. On separatrices in 1-D holomorphic dynamical systems and complex-time Newton flows. arXiv:1911.10963 math.CV
73. Dietrich, J., Lebiedz, D. A spectral view on slow invariant manifolds in complex time kinetic systems. arXiv:1912.00748 math.ph
74. Lebiedz, D. Holomorphic Hamiltonian Xi-flow and Riemann zeros. arXiv:2006.09165 math.DS
75. Dietrich, J., Lebiedz, D. Approximating normally hyperbolic invariant manifolds by trajectory based optimization. arXiv:2210.07938 math.DS

Other Publications and Reports (without Peer-Review)

1. Ishmurzin, A., Schramm, B., Lebiedz, D., Warnatz, J. Advanced tabulation for reduced chemical reaction mechanisms. Final Report „Computational Fluid Dynamics for Combustion“, Project funded by the European Community under the ´Competitive and Sustainable Growth´ Programme (2002)
2. Schramm, B., Ishmurzin, A., Lebiedz, D., Warnatz, J. ILDM Description of the Combustion of Large Hydrocarbons. 21. Deutscher Flammentag, VDI-Berichte 1750, 675 (2003)
3. Reinhardt, V., Schramm, B., Lebiedz, D., Warnatz, J. ILDM Reduced Chemistry Tailored For Large Scale Reaction Mechanisms in Complex Reactive Flow Applications, 20th ICDERS (2005)
4. Reinhardt, V., Winckler, M., Warnatz, J., Lebiedz, D. Towards automatic reduction of kinetic mechanisms by optimization of trajectories, 21st ICDERS (2007)