Alexander Mielke Date: 1 February 2024

List of Publications

In press, To appear

2. A. Mielke and S. Reichelt. Traveling fronts in a reaction-diffusion equation with a memory term. *J. Dynam. Diff. Eqns.*, 2022. Online first (doi:10.1007/s10884-022-10133-6). WIAS preprint 2836, arXiv:2104.12758.

1. A. Mielke and T. Roubíček. Qualitative study of a geodynamical rate-and-state model for elasto-plastic shear flows in crustal faults. *Interfaces Free Bound.*, 2023. Accepted. WIAS preprint 2954, arXiv:2207.11074.

Submitted

5. V. Laschos and A. Mielke. Evolutionary Variational Inequalites on the Hellinger-Kantorovich and the spherical Hellinger-Kantorovich spaces. *Submitted*, 2023. arXiv:2207.09815v3.

4. A. Mielke and S. Schindler. Existence of similarity profiles for systems of diffusion equations. *Submitted*, 2023. WIAS preprint 3007, arXiv2301.10360.

3. A. Mielke and S. Schindler. Convergence to self-similar profiles in reaction-diffusion systems. *Submitted*, 2023. WIAS Preprint 3008, arXiv2303.01364.

2. A. Mielke, T. Roubíček, and U. Stefanelli. A model of gravitational differentiation of compressible self-gravitating planets. *Submitted*, 2023. arxiv:2305.06232, WIAS preprint 3015.

1. A. Mielke, R. Rossi, and A. Stephan. On time-splitting methods for gradient flows with two dissipation mechanisms. *Submitted*, 2023. WIAS Preprint 3033, arXiv2307.16137.

Books, edited journal volumes

B9. H. Abels, K. Disser, H.-C. Kaiser, A. Mielke, and M. Thomas, editors. *Partial Differential Equations in Fluids and Solids*, volume 14. Discr. Cont. Dynam. Systems Ser. S, 2021. Pages i–iii & 3865–4157. Special Issue associated with PDE2019.

B8. B. Fiedler, M. Haragus, A. Mielke, G. Raugel, and Y. Yi, editors. *Special issue in memory of Klaus Kirchgässner*. J. Dynam. Differ. Eqns., Vol. 27 (3–4), pp. 333–1171, 2015.

B7. A. Mielke and T. Roubíček. *Rate-Independent Systems: Theory and Application*. Applied Mathematical Sciences, Vol. 193. Springer New York, 2015.

B6. S. Bianchini, E. A. Carlen, A. Mielke, and C. Villani. *Nonlinear PDE's and Applications*, volume 2028 of *Lecture Notes in Mathematics*. Springer, 2011. C.I.M.E. Summer School, Cetraro, Italy 2008, L. Ambrosio and G. Savaré (eds).

B5. A. Mielke, editor. *Analysis, Modeling and Simulation of Multiscale Problems*. Springer-Verlag, Berlin, Heidelberg, 2006.

B4. R. Helmig, A. Mielke, and B. I. Wohlmuth, editors. *Multifield Problems in Solid and Fluid Mechanics*, volume 28 of *Lecture Notes in Applied and Computational Mechanics*. Springer-Verlag, Berlin, 2006.

B3. G. Dangelmayr, B. Fiedler, K. Kirchgässner, and A. Mielke. *Dynamics of nonlinear waves in dissipative systems: reduction, bifurcation and stability*. Longman, Harlow, 1996. With a contribution by G. Raugel.

B2. A. Mielke and K. Kirchgässner, editors. *Proceedings of the IUTAM/ISIMM Symposium on Structure and Dynamics of Nonlinear Waves in Fluids*. World Scientific Publishing Co. Inc., 1995. Held in Hannover, August 17–20, 1994.

B1. A. Mielke. *Hamiltonian and Lagrangian flows on center manifolds. With applications to elliptic variational problems*, volume 1489 of *Lecture Notes in Mathematics*. Springer-Verlag, Berlin, 1991.

Survey articles

S14. A. Mielke. An introduction to the analysis of gradient systems. *Script of a lecture course*, 2023. WIAS Preprint 3022, arXiv:2306.05026.

S13. M. Kantner, T. Höhne, T. Koprucki, S. Burger, H.-J. Wünsche, F. Schmidt, A. Mielke, and U. Bandelow. Multi-dimensional modeling and simulation of semiconductor nanophotonic devices. In M. Kneissl, A. Knorr, S. Reitzenstein, and A. Hoffmann, editors, *Semiconductor Nanophotonics: Materials, Models, and Devices*, chapter 7, pages 241–283. Springer, 2020.

S12. M. Kantner, A. Mielke, M. Mittnenzweig, and N. Rotundo. Mathematical modeling of semiconductors: from quantum mechanics to devices. In J. Rodrigues and M. Hintermüller, editors, *Topics in Applied Analysis and Optimisation*, CIM Series in Mathematical Sciences, pages 269–293. Springer, 2019.

S11. A. Mielke. On evolutionary Γ-convergence for gradient systems (Ch. 3). In A. Muntean, J. Rademacher, and A. Zagaris, editors, *Macroscopic and Large Scale Phenomena: Coarse Graining, Mean Field Limits and Ergodicity*, Lecture Notes in Applied Math. Mechanics Vol. 3, pages 187–249. Springer, 2016. Proc. of Summer School in Twente University, June 2012.

S10. A. Mielke. Variational approaches and methods for dissipative material models with multiple scales. In S. Conti and K. Hackl, editors, *Analysis and Computation of Microstructure in Finite Plasticity*, volume 78 of *Lect. Notes Appl. Comp. Mechanics*, chapter 5, pages 125–155. Springer, 2015.

S9. A. Mielke. Dissipative quantum mechanics using GENERIC. In A. Johann, H.-P. Kruse, F. Rupp, and S. Schmitz, editors, *Recent Trends in Dynamical Systems*, pages 555–586. Springer Verlag, 2013. Proceedings of a Conference in Honor of Jürgen Scheurle.

S8. A. Mielke. Differential, energetic, and metric formulations for rate-independent processes. In L. Ambrosio and G. Savaré, editors, *Nonlinear PDE's and Applications*, pages 87–170. Springer, 2011. (C.I.M.E. Summer School, Cetraro, Italy 2008, Lect. Notes Math. Vol. 2028).

S7. A. Mielke. Evolution in rate-independent systems (Ch. 6). In C. Dafermos and E. Feireisl, editors, *Handbook of Differential Equations, Evolutionary Equations, vol. 2*, pages 461–559. Elsevier B.V., Amsterdam, 2005.

S6. A. Mielke. Analysis of energetic models for rate–independent materials. In T. Li, editor, *Proceedings of the Int. Congress of Mathematicians 2002, Beijing*, volume III, pages 817–828. Higher Education Press, 2002.

S5. A. Mielke. Finite elastoplasticity, Lie groups and geodesics on SL(d). In P. Newton, A. Weinstein, and P. J. Holmes, editors, *Geometry, Mechanics, and Dynamics*, pages 61–90. Springer–Verlag, New York, 2002.

S4. A. Mielke. The Ginzburg–Landau equation in its role as a modulation equation. In B. Fiedler, editor, *Handbook of Dynamical Systems II*, pages 759–834. Elsevier Science B.V., 2002.

S3. A. Mielke, G. Schneider, and H. Uecker. Stability and diffusive dynamics on extended domains. In B. Fiedler, editor, *Ergodic Theory, Analysis, and Efficient Simulation of Dynamical Systems*, pages 563–583. Springer–Verlag, 2001.

S2. A. Mielke. Mathematical analysis of sideband instabilities with application to Rayleigh-Bénard convection. In *Mechanics: from theory to computation*, pages 335–377. Springer, New York, 2000. Essays in Honor of Juan-Carlos Simo.

S1. A. Mielke and G. Schneider. Derivation and justification of the complex Ginzburg-Landau equation as a modulation equation. In P. Deift, C. Levermore, and C. Wayne, editors, *Dynamical systems and probabilistic methods in partial differential equations (Berkeley, CA, 1994)*, pages 191–216. Amer. Math. Soc., Providence, RI, 1996.

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J172. A. Mielke and S. Schindler. Self-similar patterns in coupled parabolic systems as non-equilibrium steady states. *Chaos*, 34(013150):1–12, 2024.

J171. A. Mielke. Non-equilibrium steady states as saddle points and EDP-convergence for slow-fast gradient systems. *J. Math. Physics*, 64(123502):1–20, 2023.

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J166. A. Mielke. Relating a rate-independent system and a gradient system for the case of one-homogeneous potentials. *J. Dynam. Diff. Eqns.*, 34:3143–3164, 2022.

J165. A. Mielke and J. Naumann. On the existence of global-in-time weak solutions and scaling laws for Kolmogorov's two-equation model of turbulence. *Z. angew. Math. Mech. (ZAMM)*, 102(9):e202000019/1–31, 2022.

J164. J. Fischer, K. Hopf, M. Kniely, and A. Mielke. Global existence analysis of energy-reaction-diffusion systems. *SIAM J. Math. Analysis*, 54(1):220–267, 2022.

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