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Awards

From non-smooth to smooth - on regularization using slow-fast theory

Bossolini, E. (PhD Student), Brøns, M. (Main Supervisor), Galvanetto, U. (Supervisor), Kristiansen, K. U. (Supervisor), Henriksen, C. (Examiner), Hogan, S. J. (Examiner) & Szmolyan, P. (Examiner)
Technical University of Denmark
15/10/2014 → 13/12/2017

Projects

From non-smooth to smooth - on regularization using slow-fast theory

Bossolini, E. (PhD Student), Brøns, M. (Main Supervisor), Galvanetto, U. (Supervisor), Kristiansen, K. U. (Supervisor), Henriksen, C. (Examiner), Hogan, S. J. (Examiner), Szmolyan, P. (Examiner) & Hogan, S. J. (Examiner)
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Research outputs

- Analytic weak-stable manifolds in unfoldings of saddle-nodes**
Kristiansen, K. U. & Szmolyan, P., 2025, In: *Nonlinearity*. 38 , 70 p., 025019.
- Traveling Waves and Exponential Nonlinearities in the Zeldovich–Frank-Kamenetskii Equation**
Jelbart, S., Kristiansen, K. U. & Szmolyan, P., 2025, In: *SIAM Journal on Applied Dynamical Systems*. 24, 1, p. 530-556
- A dynamical systems approach to WKB-methods: The simple turning point**
Uldall Kristiansen, K. & Szmolyan, P., 2024, In: *Journal of Differential Equations*. 406, p. 202-254
- Blowup Analysis of a Hysteresis Model Based Upon Singular Perturbations**
Kristiansen, K. U., 2024, In: *Journal of Nonlinear Science*. 34, 64 p., 6.
- Circularization in the Damped Kepler Problem**
Kristiansen, K. U. & Ortega, R., 2024, In: *SIAM Journal on Applied Dynamical Systems*. 23, 2, p. 1411-1441
- Revisiting the Kepler problem with linear drag using the blowup method and normal form theory**
Kristiansen, K. U., 2024, In: *Nonlinearity*. 37, 3, 45 p., 035014.
- Sliding Cycles of Regularized Piecewise Linear Visible–Invisible Twofolds**
Huzak, R. & Kristiansen, K. U., 2024, In: *Qualitative Theory of Dynamical Systems*. 23, 40 p., 256.
- Slow divergence integral in regularized piecewise smooth systems**
Huzak, R., Kristiansen, K. U. & Radunovic, G., 2024, In: *Electronic Journal of Qualitative Theory of Differential Equations*. 20 p., 15.
- A Review of Multiple-Time-Scale Dynamics: Fundamental Phenomena and Mathematical Methods**
Kristiansen, K. U., 2023, *Mathematics Online First Collections*. Springer, p. 1-55 (Mathematics Online First Collections).
- Geometric Singular Perturbation Analysis of the Multiple-Timescale Hodgkin-Huxley Equations**
Kaklamanos, P., Popović, N. & Kristiansen, K. U., 2023, In: *SIAM Journal on Applied Dynamical Systems*. 22, 3, p. 1552-1589
- Mixed-Mode Oscillations in Coupled FitzHugh–Nagumo Oscillators: Blow-Up Analysis of Cusped Singularities**
Kristiansen, K. U. & Pedersen, M. G., 2023, In: *SIAM Journal on Applied Dynamical Systems*. 22, 2, p. 1383-1422
- The dud canard: Existence of strong canard cycles in \mathbb{R}^3**
Kristiansen, K. U., 2023, In: *Journal of Differential Equations*. 375, p. 706-749

13. **The Painlevé paradox in three dimensions: resolution with regularization**
Cheesman, N. D., Hogan, S. J. & Kristiansen, K. U., 2023, In: Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences. 479, 2280, 21 p., 20230419.
14. **Bifurcations of mixed-mode oscillations in three-timescale systems: An extended prototypical example**
Kaklamanos, P., Popović, N. & Kristiansen, K. U., 2022, In: Chaos. 32, 26 p., 013108 .
15. **Singularly Perturbed Oscillators with Exponential Nonlinearities**
Jelbart, S., Kristiansen, K. U., Szmolyan, P. & Wechselberger, M., 2022, In: Journal of Dynamics and Differential Equations. 34, p. 1823–1875
16. **The Geometry of the Painlevé Paradox**
Cheesman, N., Hogan, S. J. & Kristiansen, K. U., 2022, In: SIAM Journal on Applied Dynamical Systems. 21, 3, p. 1798-1831
17. **The number of limit cycles for regularized piecewise polynomial systems is unbounded**
Huzak, R. & Kristiansen, K. U., 2022, In: Journal of Differential Equations. 342, p. 34-62
18. **A Stiction Oscillator under Slowly Varying Forcing: Uncovering Small Scale Phenomena using Blowup**
Kristiansen, K. U., 2021, In: SIAM Journal on Applied Dynamical Systems. 20, 4, p. 2359-2390
19. **Regularization of Isolated Codimension-2 Discontinuity Sets**
Cheesman, N., Kristiansen, K. U. & Hogan, S. J., 2021, In: SIAM Journal on Applied Dynamical Systems. 20, 4, p. 2630-2670
20. **Relaxation oscillations in substrate-depletion oscillators close to the nonsmooth limit**
Uldall Kristiansen, K. & Szmolyan, P., 2021, In: Nonlinearity. 34, 2, p. 1030-1083
21. **Singularly Perturbed Boundary-Equilibrium Bifurcations**
Jelbart, S., Kristiansen, K. U. & Wechselberger, M., 2021, In: Nonlinearity. 34, 11, p. 7371-7314
22. **Singularly perturbed boundary-focus bifurcations**
Jelbart, S., Kristiansen, K. U. & Wechselberger, M., 2021, In: Journal of Differential Equations. 296, p. 412-492
23. **A new type of relaxation oscillation in a model with rate-and-state friction: Paper**
Kristiansen, K. U., 2020, In: Nonlinearity. 33, 6, p. 2960-3037
24. **A Stiction oscillator with canards: On piecewise smooth nonuniqueness and its resolution by regularization using geometric singular perturbation theory**
Bossolini, E., Brøns, M. & Kristiansen, K. U., 2020, In: SIAM Review. 62, 4, p. 869-897
25. **On the Pitchfork Bifurcation of the Folded Node and Other Unbounded Time-Reversible Connection Problems in \mathbb{R}^3**
Kristiansen, K. U., 2020, In: SIAM Journal on Applied Dynamical Systems. 19, 3, p. 2059-2102
26. **The Regularized Visible Fold Revisited**
Kristiansen, K. U., 2020, In: Journal of Nonlinear Science. 30, p. 2463–2511
27. **Geometric singular perturbation analysis of a dynamical target mediated drug disposition model**
Kristiansen, K. U., 2019, In: Journal of Mathematical Biology. 79, 1, p. 187-222 36 p.
28. **Regularization and Geometry of Piecewise Smooth Systems with Intersecting Discontinuity Sets**
Kaklamanos, P. & Kristiansen, K. U., 2019, In: SIAM Journal on Applied Dynamical Systems. 18, 3, p. 1225-1264
29. **Resolution of the Piecewise Smooth Visible–Invisible Two-Fold Singularity in \mathbb{R}^3 Using Regularization and Blowup**
Kristiansen, K. U. & Hogan, S. J., 1 Jan 2018, In: Journal of Nonlinear Science. 29, 2, p. 723-787
30. **Le Canard de Painlevé**
Kristiansen, K. U. & Hogan, S. J., 2018, In: S I A M Journal on Applied Dynamical Systems. 17, 1, p. 859-908
31. **Blowup for flat slow manifolds: Paper**
Kristiansen, K. U., 2017, In: Nonlinearity. 30, 5, p. 2138-2184
32. **Canards in stiction: on solutions of a friction oscillator by regularization**
Bossolini, E., Brøns, M. & Kristiansen, K. U., 2017, In: S I A M Journal on Applied Dynamical Systems. 16, 4, p. 2233–2258
33. **On the approximation of the canard explosion point in singularly perturbed systems without an explicit small parameter**
Brøns, M. & Kristiansen, K. U., 2017, In: Dynamical Systems. 33, 1, p. 136-158
34. **On the regularization of impact without collision: the Painlevé paradox and compliance**
Hogan, S. J. & Kristiansen, K. U., 2017, In: Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences. 473, 2202, 18 p., 20160773.
35. **Singular limit analysis of a model for earthquake faulting**
Bossolini, E., Brøns, M. & Kristiansen, K. U., 2017, In: Nonlinearity. 30, 7, p. 2805-34
36. **Exponential estimates of symplectic slow manifolds**
Kristiansen, K. U. & Wulff, C., 2016, In: Journal of Differential Equations. 261, 1, 46 p.

37. **Computation of saddle-type slow manifolds using iterative methods**
Kristiansen, K. U., 2015, In: S I A M Journal on Applied Dynamical Systems. 14, 2, p. 1189–1227
38. **On the use of blowup to study regularizations of singularities of piecewise smooth dynamical systems in \mathbb{R}^3**
Kristiansen, K. U. & Hogan, S. J., 2015, In: S I A M Journal on Applied Dynamical Systems. 14, 1, p. 382–422
39. **Periodic orbits near a bifurcating slow manifold**
Kristiansen, K. U., 2015, In: Journal of Differential Equations. 259, 9, p. 4561–4614
40. **Regularization of Piecewise Smooth Two-Folds**
Kristiansen, K. U. & Hogan, S. J., 2015. 1 p.
41. **Regularizations of two-fold bifurcations in planar piecewise smooth systems using blowup**
Kristiansen, K. U. & Hogan, S. J., 2015, In: S I A M Journal on Applied Dynamical Systems. 14, 4, p. 1731-1786
42. **An Iterative Method for the Approximation of Fibers in Slow-Fast Systems**
Kristiansen, K. U., Brøns, M. & Starke, J., 2014, In: S I A M Journal on Applied Dynamical Systems. 13, 2, p. 861–900
43. **Numerical modelling of elastic space tethers**
Kristiansen, K. U., Palmer, P. L. & Roberts, R. M., 2012, In: Celestial Mechanics and Dynamical Astronomy. 113, 2, p. 235-254
44. **Relative attitude dynamics and control for a satellite inspection mission**
Horri, N. M., Kristiansen, K. U., Palmer, P. & Roberts, M., 2012, In: Acta Astronautica. 71, p. 109-118
45. **The Persistence of a Slow Manifold with Bifurcation**
Kristiansen, K. U., Palmer, P. & Robert, M., 2012, In: S I A M Journal on Applied Dynamical Systems. 11, 2, p. 661-683
46. **The two-body problem of a pseudo-rigid body and a rigid sphere**
Kristiansen, K. U., Vereshchagin, M., Gózdziwski, K., Palmer, P. L. & Roberts, R. M., 2012, In: Celestial Mechanics and Dynamical Astronomy. 112, p. 169-190
47. **A Unification of Models of Tethered Satellites**
Kristiansen, K. U., Palmer, P. & Roberts, M., 2011, In: S I A M Journal on Applied Dynamical Systems. 10, 3, p. 1042-1069
48. **Dynamic systems approach to the lander descent problem**
Shang, Y. H., Kristiansen, K. U. & Palmer, P. L., 2011, In: Journal of Guidance, Control, and Dynamics. 34, 3, p. 911-915
49. **Relative motion of satellites exploiting the super-integrability of Kepler's problem**
Kristiansen, K. U., Palmer, P. L. & Roberts, M., 2010, In: Celestial Mechanics and Dynamical Astronomy. 106, 4, p. 371-390