Research Output

Samuel Lanthaler

April 22, 2024

Preprints

1. "The curse of dimensionality in operator learning", S. Lanthaler, A. M. Stuart, (2023), *preprint*, *arXiv:2306.15924*
2. "Error Bounds for Learning with Vector-Valued Random Features", S. Lanthaler, N. H. Nelsen, (2023), *preprint*, *arXiv:2305.17170*
3. "Neural Oscillators are Universal", S. Lanthaler, T. K. Rusch, S. Mishra, (2023), *preprint*, *arXiv:2305.08753*
4. "The Nonlocal Neural Operator: Universal Approximation", S. Lanthaler, Z. Li, A. M. Stuart, (2023), *preprint*, *arXiv:2304.13221*
5. "Operator learning with PCA-Net: upper and lower complexity bounds", S. Lanthaler, (2023), *preprint*, *arXiv:2303.16317*

Publications in peer-reviewed scientific journals

Papers with joint authorship/as first author:

6. "On concentration in vortex sheets", S. Lanthaler, Partial Differ. Equ. Appl., **4**(13) (2023)
7. "Nonlinear Reconstruction for Operator Learning of PDEs with Discontinuities", S. Lanthaler, R. Molinar, P. Hadorn, S. Mishra, (2022), ICLR (2023)
8. "On Bayesian data assimilation for PDEs with ill-posed forward problems", S. Lanthaler, S. Mishra, F. Weber, (2022), *Inverse Problems*, **38**(8):085012 (2022)
9. "Error estimates for deeponets: A deep learning framework in infinite dimensions", S. Lanthaler, S. Mishra, G.E. Karniadakis, *Trans Math Appl*, **6**(1), (2022), tnac001,
10. "On universal approximation and error bounds for Fourier neural operators", N. Kovachki, S. Lanthaler, S. Mishra, *Journal of Machine Learning Research*, **22**(290), (2021), 1-76
11. "On the approximation of functions by tanh neural networks", T. De Ryck, S. Lanthaler, S. Mishra, *Neural Networks*, **143**, (2021), 732-750
12. "Statistical solutions of the incompressible Euler equations", S. Lanthaler, S. Mishra, C. Parés-Pulido, *Math. Models Methods Appl. Sci.* (M^3AS), **31**(2), (2021), 223-292
13. "On the conservation of energy in two-dimensional incompressible flows", S. Lanthaler, S. Mishra, C. Parés-Pulido, *Nonlinearity*, **34**(2), (2021), 1084
14. "On the convergence of the spectral viscosity method for the two-dimensional incompressible Euler equations with rough initial data", S. Lanthaler, S. Mishra, *Found Comput Math*, **20**, (2020), 1309–1362
15. "Guiding-centre theory for kinetic-magnetohydrodynamic modes in strongly flowing plasmas", S. Lanthaler, J. P. Graves, D. Pfefferlé, W. A. Cooper, *Plasma Phys. Control. Fusion*, **61**, (2019), 074006

16. "Higher order Larmor radius corrections to guiding-centre equations and application to fast ion equilibrium distributions", S. Lanthaler, D. Pfefferlé, J. P. Graves, W. A. Cooper, *Plasma Phys. Control. Fusion*, **59**, (2017), 044014

17. "Statistical solutions of hyperbolic conservation laws I: Foundations", U. S. Fjordholm and S. Lanthaler and S. Mishra, *Arch. Ration. Mech. An.*, **226**(2), (2017), 809–849

18. "Computation of measure-valued solutions for the incompressible Euler equations", S. Lanthaler, S. Mishra, *Math. Models and Methods Appl. Sci.*, **25**, (2015), 2043-2088

Co-authored papers:

19. "Three-dimensional magnetohydrodynamic equilibrium of quiescent H-modes in tokamak systems", W. A. Cooper, J. P. Graves, B. P. Duval, O. Sauter, J. M. Faustin, A. Kleiner, S. Lanthaler, H. Patten, M. Raghunathan, T.-M. Tran, *Pasma Phys. Control. Fusion*, **58**, (2016) 064002

20. "Modelling of advanced three-ion ICRF heating and fast ion generation scheme for tokamaks and stellarators", J. M. Faustin, J. P. Graves, W. A. Cooper, S. Lanthaler, L. Villard, D. Pfefferlé, J. Geiger, Ye O. Kazakov, D. Van Eester, *Pasma Phys. Control. Fusion*, **59**, (2017) 084001

21. "The DEMO wall load challenge", R. Wenninger, R. Albanese, R. Ambrosino, F. Arbeiter, J. Aubert, C. Bachmann, L. Barbato, T. Barrett, M. Beckers, W. Biel, L. Boccaccini, D. Carralero, D. Coster, T. Eich, A. Fasoli, G. Federici, M. Firdaouss, J. Graves, J. Horacek, M. Kovari, S. Lanthaler, V. Loschiavo, C. Lowry, H. Lux, G. Maddaluno, F. Maviglia, R. Mitteau, R. Neu, D. Pfefferlé, K. Schmid, M. Siccinio, B. Sieglin, C. Silva, A. Snicker, F. Subba, J. Varje and H. Zohm, *Nuclear Fusion*, **57**, (2017) 046002

22. "Stellarator nonlinearly saturated periodicity-breaking ideal magnetohydrodynamic equilibrium states", W. A. Cooper, D. López-Bruna, M. A. Ochando, F. Castejón, J. P. Graves, A. Kleiner, S. Lanthaler, H. Patten, M. Raghunathan, J. M. Faustin and the TJ-II Team, *Nuclear Fusion*, **58**, (2018) 124002

23. "Reduced models for parallel magnetic field fluctuations and their impact on pressure gradient driven MHD instabilities in axisymmetric toroidal plasmas", J. P. Graves, D. Zullino, D. Brunetti, S. Lanthaler, C. Wahlberg, *Pasma Phys. Control. Fusion*, **61**, (2019) 104003

Peer-reviewed books/monographs

- "Kinetic-MHD stability of virtually collisionless plasmas", S. Lanthaler, *PhD Thesis-No. 10'142*, (2020), EPFL
- "Computation and analysis of statistical solutions of the incompressible Euler equations", S. Lanthaler, *Diss. ETH No. 27930*, (2022), ETH Zurich

Unpublished work

- "On the first and second variation of area and its applications", S. Lanthaler, *BSc thesis, (2013) ETH Zurich*
- "Computation of measure-valued solutions of the incompressible Euler equations", S. Lanthaler, *MSc thesis, (2015) ETH Zurich*