

List of Publications

Preprints

1. Shuwen Sun, Lihong Feng, Peter Benner. Interpretable Spatial-Temporal Fusion Transformers: Multi-Output Prediction for Parametric Dynamical Systems with Time-Varying Inputs. *arXiv preprint arXiv:2505.00473*, 2025.
2. Harshit Kapadia, Peter Benner, Lihong Feng. Subspace-Distance-Enabled Active Learning for Efficient Data-Driven Model Reduction of Parametric Dynamical Systems. *arXiv preprint arXiv:2505.00460*, 2025.
3. Sridhar Chellappa, Lihong Feng, Peter Benner. Discrete empirical interpolation in the tensor t-product framework. *arXiv preprint arXiv:2410.14519*, 2024.
4. Shuwen Sun, Lihong Feng, Peter Benner. Data-Augmented Predictive Deep Neural Network: Enhancing the extrapolation capabilities of non-intrusive surrogate models. *arXiv preprint arXiv:2410.13376*, 2024.
5. Shuwen Sun, Lihong Feng, Hoon Seng Chan, Tamara Miličić, Tanja Vidaković-Koch, Fridolin Röder, Peter Benner. Parametric dynamic mode decomposition for nonlinear parametric dynamical systems. *arXiv preprint arXiv:2305.06197*, 2023.
6. Yao Yue, Lihong Feng, Peter Benner. An Adaptive Pole-Matching Method for Interpolating Reduced-Order Models. *arXiv:1908.00820*, 2019.

Book

1. System-level Modeling of MEMS; *Volume 10, Advanced Micro & Nanosystems*, T. Bechtold, G. Schrag, L. Feng (editors), WILEY-VCH, 2013. ISBN/ISSN: 9783527319039

Book Chapters

2. Lihong Feng and Peter Benner. Model Order Reduction based on Moment-Matching. In P. Benner, St. Grivet-Talocia, A. Quarteroni, G. Rozza, W. Schilders, and L. M. Silveira (Eds.), *Model Order Reduction: Volume 1: System- and Data-Driven Methods and Algorithms*, De Gruyter, pp. 57–96, 2021. DOI: 10.1515/9783110498967-003
3. Sridhar Chellappa, Lihong Feng, Valentin de la Rubia, and Peter Benner. Adaptive Interpolatory MOR by Learning the Error Estimator in the Parameter Domain. In P. Benner, T. Breiten, H. Faßbender, M. Hinze, T. Stykel and R. Zimmermann (Eds.), *Model Reduction of Complex Dynamical Systems*, Springer, pp. 92–117, 2021. DOI: 10.1007/978-3-030-72983-7_5 *arXiv Preprint arXiv:2003.02569v1*
4. J. Korvink, K. Poletkin, Y. Deng, L. Feng. A digital twin for MEMS and NEMS. In M. Rudan, R. Brunetti, S. Reggiani (Section editors), *Springer Handbook of Semiconductor Devices, Part 4, Modeling*, Chapter 3, pp. 1303–1330, 2021. DOI:10.1007/978-3-030-79827-7_36
5. S. Chellappa, L. Feng and P. Benner. An Adaptive Sampling Approach for the Reduced Basis Method. In C. Beattie, P. Benner, M. Embree, S. Gugercin, S. Lefteriu (Eds.), *Realization and Model Reduction of Dynamical Systems – A Festschrift in Honor of 70th Birthday of Thanos Antoulas*, Springer, pp. 137–155, 2022.
6. L. Feng and P. Benner. Parametric model order reduction for electro-thermal coupled problems. In E. Jan W. ter Maten, H.-G. Brachtendorf, R. Pulch and W. Schoenmaker (editors), *Nanoelectronic Coupled Problems Solutions*, part of the *Mathematics in Industry* book series (MATHINDUSTRY, volume 29), and part of the *The European Consortium for Mathematics in Industry* book sub series (TECMI, volume 29), Chapter 13, pp. 293–309, 2019.
7. N. Banagaaya, L. Feng and P. Benner. Sparse (P)MOR for electro-thermal coupled problems with many inputs. In E. Jan W. ter Maten, H.-G. Brachtendorf, R. Pulch and W. Schoenmaker (editors), *Nanoelectronic Coupled Problems Solutions*, part of the *Mathematics in Industry* book series (MATHINDUSTRY, volume 29), and part of the *The European Consortium for Mathematics in Industry* book sub series (TECMI, volume 29), Chapter 14, pp. 311–328, 2019.

8. Y. Yue, L. Feng, P. Benner, R. Pulch and S. Schöps. Reduced models and uncertainty quantification. In E. Jan W. ter Maten, H.-G. Brachtendorf, R. Pulch and W. Schoenmaker (editors), *Nanoelectronic Coupled Problems Solutions*, part of the Mathematics in Industry book series (MATHINDUSTRY, volume 29), and part of the The European Consortium for Mathematics in Industry book sub series (TECMI, volume 29), Chapter 14, pp. 329–346, 2019.
9. P. Benner, T. Breiten, and L. Feng. Matrix equations and model reduction. In Z. Bai, W. Gao, and Y. Su (editors), *Matrix Functions and Matrix Equations*, Series in Contemporary Applied Mathematics, Chapter 3, pp. 50–75, World Scientific, 2015.
10. P. Benner and L. Feng. A robust algorithm for parametric model order reduction based on implicit moment-matching. In *Reduced Order Methods for modeling and Computational reduction, MS&A Series A. Quarteroni, G. Rozza (editors)*, 9: 159–186, Springer, 2014.
11. L. Feng, P. Benner, and J. G. Korvink. System-level modeling of MEMS by means of model order reduction (mathematical approximations)-mathematical background. In *System-level Modeling of MEMS, Advanced Micro & Nanosystems Vol. 10* T. Bechtold, G. Schrag, L. Feng (editors), pp. 53–93, WILEY-VCH, 2013.
12. P. Benner and L. Feng. Recycling Krylov subspace for solving linear Systems with successive right-hand sides arising in model reduction. In *Model Reduction for Circuit Simulation, Lecture Notes in Electrical Engineering Vol. 74* P. Benner, M. Hinze and E. Jan W. ter Maten (editors), pp. 125–140, Springer-Verlag, Dordrecht, 2010.

Articles in refereed journals

13. Alexander Zuyev, Lihong Feng, Peter Benner. Estimates of the Kolmogorov n-width for nonlinear transformations with application to distributed-parameter control systems. *IEEE Control Systems Letters*. 8: 1877-1882, 2024.
14. Lihong Feng, Sridhar Chellappa, Peter Benner. A posteriori error estimation for model order reduction of parametric systems. *Advanced Modeling and Simulation in Engineering Sciences*. 11(1):5, 2024.
15. Sridhar Chellappa, Lihong Feng, Peter Benner. Accurate error estimation for model reduction of nonlinear dynamical systems via data-enhanced error closure. *Computer Methods in Applied Mechanics and Engineering*. 420:116712, 2024.
16. Harshit Kapadia, Lihong Feng, Peter Benner. Active-learning-driven surrogate modeling for efficient simulation of parametric nonlinear systems. *Computer Methods in Applied Mechanics and Engineering*. 419: 116657, 2024.
17. Cleophas Kweyu, Lihong Feng, Matthias Stein, Peter Benner. Reduced basis method for the nonlinear Poisson–Boltzmann equation regularized by the range-separated canonical tensor format. *International Journal of Nonlinear Sciences and Numerical Simulation*. 24(8): 2915-2935, 2024.
18. Sridhar Chellappa, Barış Cansız, Lihong Feng, Peter Benner, Michael Kaliske. Fast and reliable reduced-order models for cardiac electrophysiology. *GAMM-Mitteilungen*. 46(3-4): e202370014, 2024.
19. Sridhar Chellappa, Lihong Feng, Valentín de la Rubia, Peter Benner. Inf-sup-constant-free state error estimator for model order reduction of parametric systems in electromagnetics. *IEEE Transactions on Microwave Theory and Techniques*. 71(11): 4762-4777, 2023.
20. Lihong Feng. Predicting output responses of nonlinear dynamical systems with parametrized inputs using LSTM. *IEEE Journal on Multiscale and Multiphysics Computational Techniques*. 8: 97-107, 2023.
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22. Lihong Feng, Peter Benner, Daniele Romano and Giulio Antonini. Matrix-Free Transfer Function Prediction Using Model Reduction and Machine Learning. *IEEE Transactions on Microwave Theory and*

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26. Valentin de la Rubia, Sridhar Chellappa, Lihong Feng, Peter Benner. Fast A Posteriori State Error Estimation for Reliable Frequency Sweeping in Microwave Circuits via the Reduced-Basis Method. *IEEE Transactions on Microwave Theory and Techniques*. 70(11): 5172-5184, 2022. *arXiv:2110.05925*
27. Sridhar Chellappa, Lihong Feng, and Peter Benner. A Training Set Subsampling Strategy for the Reduced Basis Method. *Journal of Scientific Computing*, 89(63), 2021. DOI: 10.1007/s10915-021-01665-y *arXiv:2103.06185*.
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31. Model Order Reduction for Delay Systems by Iterative Interpolation Dominik Alfke, Giulio Antonini, Peter Benner, Lihong Feng, and Luigi Lombardi *International Journal for Numerical Methods in Engineering*. Published online 28 September 2020. DOI: 10.1002/nme.6554.
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