

List of Publications

Preprints

L. Feng, S. Chellappa, P Benner. A posteriori error estimation for model order reduction of parametric systems. DOI:10.21203/rs.3.rs-3410762/v1, 2023.

S Sun, L Feng, HS Chan, T Miličić, T Vidaković-Koch, P Benner. Parametric Dynamic Mode Decomposition for nonlinear parametric dynamical systems. *arXiv preprint arXiv:2305.06197*, 2023.

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. S. Chellappa, L. Feng and P. 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.
14. H. Kapadia, L. Feng and P. Benner. Active-learning-driven surrogate modeling for efficient simulation of parametric nonlinear systems. *Computer Methods in Applied Mechanics and Engineering*, 419:116657, 2024.
15. S. Chellappa, B. Cansız, L. Feng, P. Benner and M. Kaliske. Fast and reliable reduced-order models for cardiac electrophysiology. *GAMM-Mitteilungen*, 46 (3-4): e202370014, 2024.
16. S. Chellappa, L. Feng, V. de la Rubia and P. 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. *arXiv:2104.12802*
17. L. Feng, L. Lombardi, G. Antonini, P. Benner. Multi-fidelity error estimation accelerates greedy model reduction of complex dynamical systems. *Int J Numer Methods Eng.*, 124 (23): 5312-5333, 2023. DOI:10.1002/nme.7348. *arXiv:2301.05610*.
18. 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, DOI: 10.1109/JMMCT.2023.3242044.
19. 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 Techniques*. 70(12): 5392-5404, 2022.
20. Muhammad Altaf Khattak, Mian Ilyas Ahmad, Lihong Feng and Peter Benner. Multivariate moment matching for model order reduction of quadratic-bilinear systems using error bounds. *Advanced Modeling and Simulation in Engineering Sciences*. 9(23), 2022. DOI: 10.1186/s40323-022-00236-6 (open access) *arXiv:2105.12966v1*.
21. L. Feng, L. Lombardi, P. Benner, D. Romano and G. Antonini. Model Order Reduction for Delayed PEEC Models with Guaranteed Accuracy and Observed Stability. *IEEE Transactions on Circuits and Systems I*, 69(10): 4177-4190, 2022.
22. C. Kweyu, L. Feng, M. Stein and P. 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*. 2022. DOI: 10.1515/ijnsns-2021-0103 *arXiv:2103.00245*.
23. 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*
24. 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.

25. Lihong Feng, Guosheng Fu, Zhu Wang. A FOM/ROM Hybrid Approach for Accelerating Numerical Simulations. *Journal of Scientific Computing*, 89(63), 2021. *arXiv Preprint arXiv:2103.08642*.
26. Lihong Feng and Peter Benner. On Error Estimation for Reduced-Order Modeling of Linear Non-Parametric and Parametric Systems. *ESAIM: Mathematical Modelling and Numerical Analysis (M2AN)*, 55(2): 561-594, 2021. DOI: 10.1051/m2an/2021001 *arXiv Preprint arXiv:2003.14319*.
27. Mian Muhammad Arsalan Asif, Mian Ilyas Ahmad, Peter Benner, Lihong Feng, Tatjana Stykel. Implicit Higher-Order Moment Matching Technique for Model Reduction of Quadratic-bilinear Systems. *Journal of the Franklin Institute*, Vol. 358, Issue 3, pp. 2015-2038, 2021. DOI: 10.1016/j.franklin.2020.11.012 *arXiv:1911.05400*.
28. 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.
29. C. Kweyu, L. Feng, M. Stein, P. Benner. Fast solution of the linearized Poisson-Boltzmann equation with nonaffine parametrized boundary conditions using the reduced basis method. *Comput. Visual Sci.* 23(15), 2020. <https://doi.org/10.1007/s00791-020-00336-z> *arXiv:1705.08349*.
30. Sridhar Chellappa, Lihong Feng, Peter Benner. Adaptive Basis Construction and Improved Error Estimation for Parametric Nonlinear Dynamical Systems. *International Journal for Numerical Methods in Engineering*. DOI:10.1002/nme.6462, 2020. *arXiv:1911.05235*.
31. Lihong Feng, Peter Benner. A New Error Estimator for Reduced-order Modeling of Linear Parametric Systems. *IEEE Transactions on Microwave Theory and Techniques*, pp. 4848-4859, 2019. DOI:10.1109/TMTT.2019.2948858
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33. A.C. Antoulas, P. Benner, L. Feng. Model Reduction by Iterative Error System Approximation. *Mathematical and Computer Modelling of Dynamical Systems*. 24:2, 103-118, 2018
34. Mian Ilyas Ahmad, Peter Benner, and Lihong Feng. Interpolatory Model Reduction for Quadratic-Bilinear Systems using Error Estimators. *Engineering computations*. 36(1): 25-44, 2018.
35. Mian Ilyas Ahmada, Peter Benner and Lihong Feng. A New Two-Sided Projection Technique for Model reduction of Quadratic-Bilinear Descriptor Systems. *International Journal of Computer Mathematics*.2018. DOI: 10.1080/00207160.2018.1542134.
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37. Lihong Feng, Athanasios C. Antoulas, and Peter Benner. Some a Posteriori Error Bounds for Reduced Order Modelling of (Non-)Parametrized Linear Systems. *ESAIM: Mathematical Modelling and Numerical Analysis*. 51(6): 2127-2158, 2017.
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41. Jens Bremer, Pawan Goyal, Lihong Feng, Peter Benner, Kai Sundmacher. Nonlinear Model Order reduction for Catalytic Tubular Reactors. *Computer Aided Chemical Engineering*. 38: 2373-2378, 2016.

42. Lihong Feng; Yao Yue; Nicodemus Banagaaya; Peter Meuris; Wim Schoenmaker; Peter Benner. Parametric Modeling and Model Order Reduction for (Electro-)Thermal Analysis of Nanoelectronic Structures. *Journal of Mathematics in Industry*. 6:10, 2016.
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62. E Mattucci, L Feng, P Benner, D Romano, G Antonini. Fast Frequency-Domain Analysis for Parametric Electromagnetic Models Using Deep Learning. In proceedings of IEEE 32nd Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), 2023. DOI: 10.1109/EPEPS58208.2023.10314879
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