Nithin Govindarajan

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Areas of expertise

Numerical linear algebra, tensor methods, dynamical systems, systems theory, signal processing.

Education

Oct. 2014 - Dec. 2018 PhD in Mechanical Engineerings, University of California in Santa Barbara
Dissertation title: "Periodic approximations and spectral analysis of the Koopman operator: theory and applications".
Advisors: I. Mezić, S. Chandrasekaran.

Sep. 2009 - Oct. 2012 MSc in Aerospace Engineering (with honors), Technische Universiteit Delft
Master thesis: "An Optimal Control Approach for Estimating Aircraft Command Margins".
Advisors: Q.P. Chu, C.C. de Visser.

Jul. 2009 BSc in Aerospace Engineering (with honors), Technische Universiteit Delft

Work experience

Aug. 2019 - present Postdoctoral researcher, KU Leuven, Belgium

Feb. 2019 - July 2019 Lecturer Mathematics, University of Amsterdam (UvA), The Netherlands

Nov. 2012 - May 2013 Junior R&D engineer, National Aerospace Laboratory, Amsterdam, The Netherlands

Sep. 2011 - May 2012 Intern, Mission Critical Technologies Inc. (on site at NASA Ames), Moffet Field, CA

Fellowships, honors & awards

Apr. 2016 CCDC fellowship, Center for Control, Dynamics and Computation, Santa Barbara, CA

Apr. 2014 Department Merit Fellowship (UCSB Mech. Eng), Santa Barbara, CA

Mar. 2013 Fulbright scholarship (awarded), Fulbright office, Amsterdam, The Netherlands

May 2011 Huygens Scholarship Programme, Nuffic, The Hague, The Netherlands

Publications

Journal Publications

2022 Govindarajan, N., Vervliet, N., & De Lathauwer, L. (2022). Regression and classification with spline-based separable expansions. Frontiers in big Data, 5, 688496.

2022 Govindarajan, N., Epperly, E. N., & Lathauwer, L. D. (2022). $(L_r, L_r, 1)$-Decompositions, Sparse Component Analysis, and the Blind Separation of Sums of Exponentials. SIAM Journal on Matrix Analysis and Applications, 43(2), 912-938.

2021 Epperly, E. N., Govindarajan, N., & Chandrasekaran, S. (2021). Minimal rank completions for overlapping blocks. Linear Algebra and its Applications, 627, 185-198.

2021 Govindarajan, N., Mohr, R., Chandrasekaran, S., & Mezic, I. (2021). On the approximation of Koopman spectra of measure-preserving flows. SIAM Journal on Applied Dynamical Systems, 20(1), 232-261.

2019 Govindarajan, N., Mohr, R., Chandrasekaran, S., & Mezic, I. (2019). On the approximation of Koopman spectra for measure preserving transformations. SIAM Journal on Applied Dynamical Systems, 18(3), 1454-1497.

2015 Govindarajan, N., De Visser, C. C., Van Kampen, E., Krishnakumar, K., Barlow, J., & Stepanyan, V. (2015). Optimal control framework for estimating autopilot safety margins. Journal of Guidance, Control, and Dynamics, 38(7), 1197-1207.

2014 Govindarajan, N., de Visser, C. C., & Krishnakumar, K. (2014). A sparse collocation method for solving time-dependent HJB equations using multivariate B-splines. Automatica, 50(9), 2234-2244.

Conference proceedings

2023 Widdershoven, R., Govindarajan, N., De Lathauwer, L. (2023, September). Overdetermined systems of polynomial equations: tensor-based solution and application. Proceedings of EUSIPCO 2023, Helsinki, Finland.

2018 Chandrasekaran, S., Govindarajan, N., & Rajagopal, A. (2018, July). Fast Algorithms for Displacement and Low-Rank Structured Matrices. In Proceedings of the 2018 ACM International Symposium on Symbolic and Algebraic Computation (pp. 17-22).

2016 Govindarajan, N., Arbabi, H., Van Blargian, L., Matchen, T., & Tegling, E. (2016, December). An operator-theoretic viewpoint to non-smooth dynamical systems: Koopman analysis of a hybrid pendulum. In 2016 IEEE 55th Conference on Decision and Control (CDC) (pp. 6477-6484). IEEE.

Preprints & Tech reports

2023 Govindarajan, N., Widdershoven, R., Chandrasekaran, S. (2023). A fast algorithm for computing Macaulay nullspaces of bivariate polynomial systems. ESAT Tech Report 23-16.

2019 Chandrasekaran, S., Epperly, E. N., Govindarajan, N. (2019). Graph-induced rank structures and their representations. arXiv preprint arXiv:1911.05858 [math.NA].

Selected talks

2023 "A tensor-based approach to solving systems of multivariate polynomials", CAM23, Selva di Fasano.

2023 "Efficient Computation of Macaulay Matrix Null Spaces Through Exploiting Shift-Invariant Structures", SIAM AG23, Eindhoven.

2021 "$(L_r, L_r, 1)$-decompositions, Sparse Component Analysis, and the Blind Separation of Sums
2018 of Exponentials", SeLMA meeting, Leuven. "Spline-based separable expansions for approximation, regression and classification", IPAM Workshop I: Tensor Methods and their Applications in the Physical and Data Sciences, UCLA (online)

2017 "A toolbox for computing spectral properties of dynamical systems", SIAM DS17, Snowbird.

2016 "An operator-theoretic viewpoint to non-smooth dynamical systems: Koopman analysis of a hybrid pendulum", IEEE CDC 16, Las Vegas.

Teaching

Lead instructor & course organizor

Semester 1 2019/2020	Numerical mathematics, Amsterdam University College

Co-instructor

March 2022	Fast algorithms for dense structured matrices, KU Leuven
Semester 2 2021/2022	Numerieke modellering & benadering, KU Leuven
Semester 2 2019/2020	Numerieke modellering & benadering, KU Leuven

Teaching assistant

Semester 1 2021/2022	Numerieke wiskunde, KU Leuven
Semester 1 2020/2021	Numerieke wiskunde, KU Leuven
Semester 1 2019/2020	Numerieke wiskunde, KU Leuven
Spring 2018	Control theory, UCSB
Winter 2017	Electrical circuits Lab, UCSB
Fall 2017	Intro to programming in Matlab, UCSB
Summer 2017	Dynamics, UCSB
Summer 2017	Physics Lab: intro to classical mechanics for non-engineers, UCSB
Spring 2017	Dynamics, UCSB
Spring 2015	Dynamics, UCSB
Winter 2015	Vibrations, UCSB
Fall 2014	Statics, UCSB

Software skills

Matlab, Python, Mathematica, C++ (basic), Julia, Latex, Git.

Languages

English, Dutch.

Last updated: October 28, 2023