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**“Low-rank channel estimation and beamforming
optimization of RIS-assisted communications”**

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Kirchhoffbau, K2001

Abstract: In this talk, we first present a pilot decoupling-based two-dimensional channel parameter estimation method for intelligent reflecting surface (IRS)-assisted communications. By exploiting the low-rank nature and the geometrical structure of arrays deployed at the base station, the IRS, and the user equipment, we discuss low-complexity channel parameter estimation methods that rely on pilot design along the horizontal and vertical domains, the overall channel parameter estimation problem is decoupled into different domains. With this decoupling, it is possible to simultaneously sense/estimate the channel parameters and to communicate with the sensed node. We also discuss low-complexity joint passive and active beamforming optimization methods for IRS-assisted communications that exploit the inherent Kronecker product structure of the channel matrix to split the global beamforming optimization problem into lower dimensional horizontal and vertical sub-problems.

Short biography

**Prof. André L. F. de Almeida, Department of Teleinformatics Engineering,
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André L. F. de Almeida is an Associate Professor with the Department of Teleinformatics Engineering of the Federal University of Ceara. He received a double Ph.D. degree in Sciences and Teleinformatics Engineering from the University of Nice, Sophia Antipolis, France, and the Federal University of Ceara, Fortaleza, Brazil, in 2007. He was awarded multiple Visiting Professor positions at the University of Nice Sophia-Antipolis, France (2012-2019). He served as an Associate Editor for the IEEE Transactions on Signal Processing (2012-2016), and for the IEEE Signal Processing Letters (2016-2020). Dr. Almeida is an elected member of the IEEE Signal Processing Society (SPS) Signal Processing Theory and Methods (SPTM) Technical Committee (2022-2024), and an elected member of the EURASIP Signal Processing for Multi-Sensor Systems Technical Area Committee (SPMuS TAC) (2016-2018 and 2019-2022). In 2021, he was elected as the vice-chair of the SPMuS TAC (2022-2023). He also served on the IEEE SPS Sensor Array and Multichannel (SAM) Technical Committee (2015-2018 and 2018-2021). Prof. Almeida serves as an IEEE SPS Regional Director-at-Large for Regions 7 & 9 (2022-2023). He also served as an Associate Member of the Big Data Special Interest Group (SIG) of the IEEE SPS (2015-2018). He was involved in the organization and chairing of several IEEE SPS conferences. In particular, he was a General Co-Chair of the 2017 IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP'2017), Technical Co-Chair of the IEEE GlobalSIP'2018 and IEEE GlobalSIP'2019 Symposia on Tensor Methods for Signal Processing and Machine Learning, Technical Co-Chair of the 11th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM'2020), and is the General Co-Chair of the IEEE CAMSAP'2023, Costa Rica. In January 2018 he was elected as an affiliate member of the Brazilian Academy of Sciences. He has published over 240 papers in journals and conferences, 6 book chapters, and is co-inventor of several international patents. His research interests include the topics of channel estimation, sensor array processing, and multi-antenna systems. An important part of his research has been devoted to multilinear algebra and tensor decompositions with applications to communications and signal processing.

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