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“Robust MMSE Precoding and Power Allocation Techniques for Cell-Free Networks”

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Abstract: In this presentation, we consider the downlink channel of a cell-free massive multiple-input multiple-output (MIMO) network with access points (APs) that serve users that are distributed over an area. We present an iterative robust linear minimum mean-square error (RMMSE) precoding technique along with optimal and uniform power allocation. We also derive achievable rate expressions for the proposed iterative RMMSE precoder and power allocation approaches. Numerical results show that the proposed iterative MMSE precoder and power allocation techniques outperform existing conjugate beamforming (CB), zero-forcing (ZF) and MMSE schemes in terms of achievable sum-rate and bit error rate (BER), in the presence of perfect and imperfect channel state information (CSI).

Short biography

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Rodrigo C. de Lamare was born in Rio de Janeiro, Brazil, in 1975. He attended Colégio Santo Inácio and then studied electronic engineering at the School of Engineering of the Federal University of Rio de Janeiro (UFRJ). He received his Diploma in electronic engineering from UFRJ in 1998 and the MSc and PhD degrees in electrical engineering from the Pontifical Catholic University of Rio de Janeiro (PUC-RIO) in 2001 and 2004, respectively. He then worked as a Postdoctoral Fellow from January to June 2005 at the Centre for Telecommunications Studies (CETUC), PUC-RIO and from July 2005 to January 2006 at the Signal Processing Laboratory, UFRJ. Since January 2006, he has been with the Communications Group, Department of Electronics, University of York, United Kingdom, where he is a Professor. Since April 2013, he has also been a Professor at PUC-RIO. Dr de Lamare has participated in numerous projects funded by government agencies and industrial companies. He received a number of awards for his research work and has served as the general chair of the IEEE 7th International Symposium on Wireless Communication Systems (ISWCS) 2010, held in York, UK in September 2010, as the technical programme chair of ISWCS 2013 and WSA 2015 in Ilmenau, Germany, as the general chair of the 9th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM) in Rio de Janeiro, Brazil, in July 2016, as the co-general chair of ISWCS 2018, held in Lisbon, Portugal, and as the general chair of the 21st IEEE Statistical Signal Processing Workshop (SSP) in 2020, in Rio de Janeiro, Brazil. Prof. de Lamare is a senior member of the IEEE, served as an elected member of the IEEE Signal Processing Theory and Method, and currently serves the IEEE Signal Processing for Communications and Networking technical committees of the IEEE Signal Processing Society. He served as editor for IEEE Transactions on Communications and IEEE Wireless Communications Letters. His research interests lie in communications and signal processing, areas in which he has published over 450 papers in international journals and conferences.