

RIS-Assisted ISAC with Interference Management and Localization for B5G Wireless Networks

Abdelrahman Elkhateeb
Greenerwave

abdelrahman.elkhateeb@greenerwave.com

Youssef Nasser
Greenerwave

youssef.nasser@greenerwave.com

Abstract—Due to the rapid growth of data traffic across many communication scenarios, modern spectrum resources for the next sixth generation (6G) should be created quickly. Reconfigurable intelligent surface (RIS) is a promising lowcost technology that can adaptively change the phase of signals to improve system performance. Integrated Sensing and Communication (ISAC) is another promising technology in the 6G communication networks as it is allowing seamless convergence of communication and sensing. In this work, we explore the integration of RIS to enhance ISAC functionalities to support both high-capacity data transmission, accurate sensing, robust interference management, and high-precision localization. We aim to leverage the programmable nature of RIS to dynamically suppress inter-user and inter-operator interference to improve the overall reliability and spectral efficiency of ISAC systems. Furthermore, we investigated advanced localization techniques, enabling accurate user positioning in wireless environments. Our work is done within EXACT-6G project to investigate advanced RIS control algorithms that jointly optimize the RIS reflective properties to meet the dual requirements of communication and sensing, while also addressing the critical challenges of interference management and advanced localization for beyond-5G (B5G) networks.

Index Terms—RIS, ISAC.

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