

Dual-RIS Assisted 3D Positioning and Beamforming Design in ISAC System

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Abstract—Integrated sensing and communication (ISAC) technology as a research focus in 6G communications commonly works in high frequency band, which may suffer severe fading caused by obstacle. Reconfigurable intelligent surface (RIS) can overcome the above issue and improve the performance of ISAC system through phase adjustment. In this paper, dual-RIS assisted 3D positioning and beamforming design in ISAC system are studied. Firstly, the localization in the ISAC system is transformed into a compressed sensing (CS) problem, and a stepwise matching pursuit (SMP) algorithm is proposed for better positioning ability and lower complexity, compared with the typical matching pursuit (MP) algorithm. Then, the positioning information is utilized for the beamforming design of the RISs to maximize the system achievable rate through the alternating optimization algorithm based on the triangle inequality (TI-AO). Simulation results show that the system achievable rate of the optimization design is close to the optimal one and verifies the effectiveness of the proposed framework.

Keyword—Integrated sensing and communication (ISAC), reconfigurable intelligent surface (RIS), stepwise matching pursuit (SMP), beamforming design



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