

Comparative Analysis of Single Versus Multi-IRS Assisted Multi-User Wireless Communication System

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Abstract : Intelligent reflecting surfaces (IRSs) are considered to be a key enabling technology for sixth-generation (6G) wireless networks. IRSs are electromagnetic (EM) surfaces that are fabricated and have integrated electronics, electronically controlled processes, and particularly wireless communication features. IRSs operate without the need for complex signal processing and the encoding and decoding steps that improve the signal quality at the receiver. Improving vital performance parameters such as energy efficiency (EE) and spectral efficiency (SE) have frequently been the primary goals of research in order to meet the increasing requirements for advanced services in the future 6G communications. In this research, we conduct a comparative analysis on single and multi-IRS wireless communication networks using energy and spectrum efficiency. The energy efficiency versus user distance, energy efficiency versus signal to noise ratio, and spectral efficiency versus user distance are the basis for our result with 1, 2, 4, and 6 IRSs. According to the results of our simulation, in terms of energy and spectral efficiency, six IRS perform better than four, two, and single IRS. Overall, our results suggest that multi-IRS-assisted wireless communication systems outperform single IRS systems in terms of communication performance.

Keywords : sixth-generation (6G), wireless networks, intelligent reflecting surfaces, energy efficiency, spectral efficiency

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