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Cooperative Non-Orthogonal Multiple Access for Two-Way Relay Networks

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Abstract

In this paper, we propose a cooperative non-orthogonal multiple access (NOMA) based relaying scheme for a two-way relay network (TWRN) where one user communicates with the base station (BS) directly while the other indirect-link user exchanges message with the BS via the help of a decode-and-forward (DF) relay station. We analyze the sum-rate performance of the proposed scheme, and derive a closed-form expression for the ergodic capacity. Furthermore, we analyze the asymptotic performance in the high signal-to-noise ratio (SNR) region. Simulation results show that the proposed DF based cooperative NOMA TWR transmission scheme achieves a much higher sum-rate than its AF counterpart and conventional time-division multiple access (TDMA) based scheme.

Keywords: Cooperative NOMA, two-way relay network, decode-and-forward, asymptotic analysis

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