

Performance evaluation of multiuser diversity in multiuser two-hop cooperative multi-relay wireless networks using maximal ratio combining over Rayleigh fading channels

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Abstract: Multiuser diversity (MUD) cooperative wireless networks combine the features of the MIMO systems without confronting the physical layer constraints by providing multiple copies of the transmitted signal from the source to the destination with the help of the relay node. Cooperative wireless networks have attracted the full attention in the last few years and are implemented widely in many wireless communication systems to adapt for the fading impairments, provide higher data rates, and improve the performance of the wireless communication systems. In this paper, we present an informative study for the reason of evaluating the performance of the MUD in the multiuser two-hop cooperative multi-relay networks using maximal ratio combining. Furthermore, we derive tight closed-form expressions of outage probability and symbol error probability for the amplify-and-forward and decode-and-forward protocols with the MUD. Additionally, we conduct a simulation study to show to what extent our analytical and simulation results agree with each other. It is worthy to mention that our analytical and simulation results agree fairly with each other under high average signal-to-noise ratio, whereas they show that our proposed system with multiple relays provides significant improvements over those previously proposed systems having only one relay.