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Optimal positioning of relay node in wireless cooperative communication networks

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Abstract:

In this paper, we consider a wireless cooperative communication network that consists of single source, single relay, and single destination and derive a general upper bound (UB) on the end-to-end bit error rate (BER). The relay node uses the decode and forward (DF) cooperation protocol in order to increase the reliability of the source data at the destination. The derivation takes into account the distances between the system nodes in addition to the channel noise and fading effects. The destination uses the maximum a posterior (MAP) decoder to estimate the data sent from the source. The derived UB is very tight and it almost coincides with the exact BER results obtained from simulations. Therefore, the closed form expression of the UB can be used for further studies. In this paper, we use the UB closed form expression to study the effects of the relay position on the BER performance. The genetic algorithm is used to find the optimal location of the relay node.

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