

Throughput of Two-Hop Wireless Networks with Relay Cooperation

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Abstract

In this paper, we consider the throughput problem of a wireless fading network with two-hop relaying, where n single antenna source-destination pairs communicate through a set of single antenna relays using *amplify-and-forward* strategy. Two different cooperation schemes at the relay nodes are considered, where the relays share either channel state information (CSI) or both CSI and received signals. The high level of cooperation is justified for a case where the relaying role is fulfilled by infrastructure nodes that can communicate through a wired backbone without an overhead on the wireless channel. We show that in the first case, at least n^2 relays are needed to achieve linear scaling of the system throughput versus n . In the second case, exchanging the received signals at the relays can reduce the needed number of relays to n in order to achieve linear scaling. It is also shown that the second cooperation scheme achieves a strictly positive per node throughput, where the total number of nodes accounted for includes the relays.