

Non-coherent two-way relaying with amplify-and-forward

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Abstract:

We study the two-user MIMO block fading two-way relay channel in the non-coherent setting, where neither the terminals nor the relay have transmit or receive knowledge of the channel realizations. We present a lower bound on the achievable sum-rate with amplify-and-forward (AF) at the relay node. As a byproduct we present an achievable pre-log region of the AF scheme, defined as the limiting ratio of the rate region to the logarithm of the signal-to-noise ratio (SNR) as the SNR tends to infinity. A comparison is presented with time-division-multiple-access (TDMA) scheme, both in the coherent and non-coherent setup. The analysis is supported by a geometric interpretation, based on the paradigm of subspace-based communication.