

Beamforming design and relay selection for multiple MIMO AF relay systems with limited feedback

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Abstract:

In this paper we consider a half-duplex multipleinput multiple-output (MIMO) cooperative amplify-and-forward (AF) relay network with multiple relay nodes. Firstly, we assume the channel state information (CSI) is available at all nodes to investigate the optimal source and relay beamforming vector design and relay selection. Based on this structure, a new scheme of limited feedback joint effective relay selection and beamforming vector design is proposed, which uses a new strategy to share channel information between relay and destination. This proposed scheme, which chooses the best relay and optimizes the beamforming vectors maximizing the received SNR, can significantly reduce the required number of feedback bits and maintain a suitable performance compared to the optimal non-practical solution. Simulation results show that our scheme approaches the performance of the scheme with full CSI assumption and outperforms conventional schemes, while having lower computational complexity and lower feedback delay. The cooperative diversity gain is also verified by the simulation result.