Improve the Degree of Freedom with Mixed CSIT in Distributed Cooperative Relay System

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Abstract:

This paper characterizes the degrees of freedom regions for the multi-user by using interference alignment in a distributed relay system with totally delayed and not too delayed CSI feedback. As a part of the characterization, some new transmission schemes for the relay interference alignment based on the previous Maddah-Ali and Tse (MAT) scheme and Space-Time Interference Alignment (STIA) are proposed. The consequence of the results shows that the achievable gain of sum Degree of Freedom(DoF) can be improved significantly in Delayed Source-Destination channels and ideal Relay-Destination channels; meanwhile, the complexity of Base Station pr ecoding process can be significantly reduced when the quantity of multi-users K is very large. An adaptive linear precoding and MAT combined scheme are also proposed in non-ideal Relay-Destination channels, which aim to simplify the previous MAT precoding process and improve the degree of freedom in different propagation scenarios when partly and totally delayed CSIT occur in Relay-Destination channels.