Abstract: Linear precoding for wireless multi-input-multi-output (MIMO) transceivers has demonstrated substantial strength in cooperative relay networks for achieving high system capacity and for improving receiver performance. However, traditional precoder optimization critically relies on knowledge acquisition of channel state information available at source node. For linear MIMO precoding design at the source, we propose a novel method to estimate the quadratic product of forward-link channel information between source node and relay node. To conserve bandwidth, our source node estimates the forward-link MIMO channel by utilizing signals transmitted by amplify-and-forward (AF) relay node to destination node without requiring the cumbersome default method of coordinated relay channel estimation and relay feedback of its estimated channel state information. From the overhead AF relay signals, the source node simply extracts the quadratic channel information of its forward-link before designing its channel-depending precoder. In addition to presenting a low overhead method for forward channel estimation, our method saves bandwidth and provides the opportunity for extending the use of MIMO to other wireless scenarios.

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