A tight outer bound of the degrees of freedom for the MIMO interference channel with the delayed CSIT and partial local feedback.

Summary: We research a new model for the general two-user MIMO interference channel. The model is constructed under the assumption that the instantaneous channel state information (CSI) is available to the receive nodes and the delayed CSI at transmitters (defined as CSIT) and partial local feedback are accessible to the transmit nodes. From this model, an outer bound of the Degrees Of Freedom (DOF) region has been deduced for such channel. A special case of (6,1,5,2) interference channel is used to demonstrate the proposed interference cancellation scheme. This case shows that the limit DOF pairs (3,1) and (\(\frac{9}{2}, \frac{1}{2}\)) lied on the region boundary can be achieved. Based on this scheme, the general demonstration for the achievability of the DOF region is also presented. Our work shows that the derived outer bound is tight and under some cases, the DOF region with delayed CSIT and partial local feedback is comparable to that with instantaneous CSIT or delayed CSIT and global feedback.

Keywords: two-user MIMO interference channel; instantaneous channel state information (CSI); degrees of freedom (DOF) region

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