

This paper studies two-user cognitive multiple-input multiple-output (MIMO) interference channel with delayed channel state information at transmitter (CSIT), where a transmitter possesses noncasual knowledge of data originating at the other user. We first derive an upper bound of degrees-of-freedom (DoF) region and then propose DoF bound achieving schemes for various antenna configurations. Since interference condition and interference suppression capability vary with antenna configurations, the proposed DoF optimal schemes differently utilize cognitive transmission based on delayed CSIT to suppress interference and thus differ in the required numbers of time slots and transmit symbols, although the key idea of swapping interfering signals between users is common. Comparing with the DoF regions of relevant channels, we identify and analyze the contributions of cognitive transmission and delay CSIT toward enlarging the DoF region. Our analysis specifies antenna configurations where delayed CSIT and cognitive transmission are useful, respectively.