Blind Null-space Tracking for MIMO Underlay Cognitive Radio Networks

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Blind Null Space Learning (BNSL) has recently been proposed for fast and accurate learning of the null-space associated with the channel matrix between a secondary transmitter and a primary receiver. In this paper we propose a channel tracking enhancement of the algorithm, namely the Blind Null Space Tracking (BNST) algorithm that allows transmission of information to the Secondary Receiver (SR) while simultaneously learning the null-space of the time-varying target channel. Specifically, the enhanced algorithm initially performs a BNSL sweep in order to acquire the null space. Then, it performs modified Jacobi rotations such that the induced interference to the primary receiver is kept lower than a given threshold P_{Th} with probability p while information is transmitted to the SR simultaneously. We present simulation results indicating that the proposed approach has strictly better performance over the BNSL algorithm for channels with independent Rayleigh fading with a small Doppler frequency.

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