

Novel Time Domain Channel Estimation using a Cyclic Property of Scattered Pilot for OFDM in Large Delay Spread Channel

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Abstract— Orthogonal frequency division multiplexing (OFDM) based on scattered pilot (SP) can accurately estimate the channel state information (CSI) with small number of pilot signals under the fast fading channel. In fact, the channel response at a particular subcarrier frequency is not supposed to be totally different from its neighboring frequencies, and they must have correlation which depends on the coherence bandwidth of channel. Therefore, the frequency separation of SP should be smaller than the coherence bandwidth. However, when the maximum delay spread exceeds the length of GI, unacceptable degradation of error performance is caused by inter-symbol-interference (ISI) and inter-carrier-interference (ICI). Moreover, coherence bandwidth is also to be narrow. In this case, channel estimation of SP-OFDM based on the frequency interpolation is poorly operated due to narrow coherence bandwidth. To mitigate this problem, in this paper, we propose the novel time domain channel estimation scheme using a cyclic property of SP for OFDM.

Keyword—SP-OFDM, cyclic property of SP, ISI, ICI, replica signal

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