

An Iterative Receiver Design with CFO, SFO, Channel Estimation and Equalization for OFDM Systems over Multipath Fading Channels

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Abstract— An iteration scheme is proposed to robust carrier frequency offset (CFO), sampling frequency offset (SFO) and channel impulse response (CIR) estimation for OFDM systems over synchronization errors and multipath fading channel environments. The development of the estimators involves the following procedures. First, a joint time-frequency cross-correlation scheme is proposed to estimate CFO and SFO, which can resist the multipath fading channel effect. Next, using the estimated CFO and SFO parameters, a least square (LS) algorithm with low dimensional sub-block transformed-preamble is utilized to estimate CIR. Finally, with inter-carrier interference (ICI) cancellation, the proposed estimators can provide more accurate parameters estimation. The main advantage of the proposed estimators is lower computational complexity. Computer simulation results show that the proposed estimators with ICI cancellation can obviously offer better performance and overcome the error floor problem at higher SNR scenario.

Keywords— OFDM, carrier frequency offset, sampling frequency offset, channel impulse response, least square, inter-carrier interference.



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