

ANALYSIS OF SYNCHRONIZATION OFFSETS EFFECT ON UPLINK MIMO-OFDMA SYSTEMS.

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Synchronization offsets such as time (TO), carrier frequency (CFO), and sampling clock frequency (SCFO) offsets, destroy user's signal orthogonality in Multiple-Input Multiple-Output Orthogonal Frequency Division Multiple Access (MIMO-OFDMA) fading channel uplink systems, resulting in an interference-limited system. To cope with these impairments, performance evaluations, which can be derived as degradation in metrics of power loss such as Signal-to-Interference (plus Noise) Ratio (SI(N)R) or as an error rate measurement such as Bit Error Rate/Symbol Error Rate (BER/SER), have been proposed.

This research investigates the impact of synchronization offsets on the performance of the uplink MIMO-OFDMA systems over multipath fading channel in terms of instantaneous/average SINR at the DFT output of the receiver based on the contents of the DFT window. In addition, the boundaries of the TO are precisely determined. However, the SINR performance evaluation is carried out for arbitrary Subcarrier Allocation Schemes (SASs), and MIMO systems properties as well as various CP conditions, where there is no prior assumption on the interferences' statistical properties. A general expression for BER/SER is derived based on the analyzed SINR in presence of synchronization offsets. The results obtained in this work, determine the requirements on the accuracy of offsets estimation algorithms when an acceptable amount of performance degradation is given.