

REINVESTIGATION OF PILOT TRANSMISSION ISSUES FOR OFDM WITH AN EFFICIENT SOLUTION

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Abstract

In this paper, initially, the various existing pilot signal arrangements are studied and compared for OFDM system over time varying channel environment and highlighted in brief. Comparing two basic schemes, Block method has drawback of bandwidth efficiency while comb method has of spectral efficiency. Finally, in this paper, attempt is made to give an intermediate solution between block and comb methods in order to improve spectrum as well as bandwidth efficiency. An imposed pilot method based on splitted short training sequences appended with data among only few tones is proposed here for frame based transmission. Based on this, the channel estimation scheme is also proposed and the whole system is analyzed along with BER performance. Instead of same sequences to all pilot tones, a complete training sequence is divided into short sequences. Sequences appended to different data blocks will be different at pilot positions to add randomness throughout the frame while undergoing random channel effects. Thus pilot will be carrying data as well as training information. At receiving end, such training symbols extracted from all the pilots are combined and time domain channel estimation is performed to demodulate the signal with phase corrections. Also, the various issues related to pilot carrier transmission power, pilot carrier spacing, Number of pilots (selection is obvious between comb and block) and effect on Peak to Average Power Ratio (PAPR) are studied. The impact of size of the short training sequence is also analyzed.

Keywords: Pilots tones, pilot symbols, channel estimation, OFDM

Subject Classification: Wireless Communication