Channel Estimations Schemes for OFDM Radio Systems with Pilot Channels

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ABSTRACT

The channel estimation schemes of the OFDM systems with pilot channels are investigate for frequency selective fading channels. Firstly, the performance of the conventional linear interpolation and weight interpolation schemes are considered. Secondly, the time correlation coefficient estimation scheme with linear and weight interpolation are proposed, and their simulations are performed and compared. Consider the OFDM system that has two pilot channels and a data length of 512 bytes per frame. According to the simulation results and referring to a performance of BER=10-3, the performance of the time correlation estimation with linear interpolation can provide over 10dB than the conventional linear and weight interpolation schemes. Time correlation with weight interpolation has the same performance as the conventional weight interpolation schemes, but has more 4dB than that of the conventional linear interpolation scheme. When the number of pilot channels is increase to four, the performance of the time correlation estimation scheme and the conventional weight interpolation schemes remain the same, while a 5dB improvement can be obtained for the conventional linear interpolation scheme. In time correlation estimation schemes, because the number of pilot channels can be reduced without performance degradation, the data transmission capacity is increase accordingly. From the simulations, we find the performance improvement decrease 5dB when the data length frame is increase for 512bytes to 1024bytes. In general, the proposed time correlation estimation schemes are able to provide better channel estimation performance, while performance is inversely proportional to the frame length.

Keywords : OFDM ; conventional linear interpolation ; weight interpolation channel estimation ; time correlation estimation scheme ; pilot ; IEEE802.11a

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