# Channel Estimation for an OFDM-Based MIMO System

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## ABSTRACT

We consider the problem of channel estimation for an orthogonal frequency-division multiplexing (OFDM)-based multiple-input multiple-output (MIMO) wireless local area network system. We show that an existing channel estimation approach, which is based on a sub-carrier level orthogonal training symbol design and the finite impulse response channel model, can suffer from severe performance degradations for realistic OFDM channels. As such, we propose a new channel estimation approach, which employs a modified version of this training symbol design and a polynomial fitting/interpolation method. Our simulation results show that our new channel estimation approach significantly outperforms the existing one for the realistic OFDM channels.

## INDEX TERMS

Channel estimation, OFDM, MIMO system, Wireless LAN standards.

## IMPORTANT CONTRIBUTIONS

This paper argues that the FIR channel model cannot accurately characterize the channels for the OFDM-based systems but is a good choice for simple system performance simulations.

Based on this augument, this paper proposes a new channel estimation approach, a polynomial fitting/interpolation method based on a modified training symbol design, for an OFDM-based MIMO WLAN system. Simulation results have shown that the new channel estimation approach can significantly outperform existing ones.

IMPOTANT CITATIONS

- [1] proposed an FIR (finite impulse response) filter channel model for the simulation of the time-dispersive fading channels for the OFDM-based communication systems.

- [2] used a non-FIR channel for channel estimation as the FIR channel model is not appropriate for channel estimation.

- [3] uses polynomial approximation of the channel.

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