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On the channel estimation based on superimposed pilots for m-MIMO

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5G wireless systems requires a huge growth in user bit rates and overall system throughput. This requires a substantial spectral efficiency increase, while maintaining or even improving power efficiency. To accomplish this, one needs new transmission techniques, with the most promising ones being millimeter Waves (mm-Waves) and massive Multiple-Input Multiple-Output (m-MIMO). M-MIMO schemes involving hundreds or even thousands of antenna elements are expected to be central technologies for 5G systems. It is considered the use of m-MIMO combined with single-carrier with frequency-domain equalization (SC-FDE) modulations, which aims to reduce the Peak-to-Average Power Ratio, as compared to other block transmission techniques (e.g., OFDM). A low-complexity iterative frequency-domain receiver based on the maximum ratio combining and equal gain combining approach is proposed. It is proposed an iterative receiver, which considers an iterative detection and channel estimation. The channel estimates usually obtained with the help of pilot symbols and/or training sequences are multiplexed with data symbols. Since this leads to spectral degradation, the use of superimposed pilots (i.e., pilots added to data) is an alternative solution. Our performance results show that the proposed receiver allows excellent performance with the use of the channel data obtained from the channel estimation, while keeping the complexity at low level.

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