An Improved Data Aided Channel Estimation Technique Using Genetic Algorithm for Massive Multi-Input Multiple-Output

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Abstract : With the increasing rate of wireless devices and high bandwidth operations, wireless networking and communications are becoming over crowded. To cope with such crowdy and messy situation, massive MIMO is designed to work with hundreds of low costs serving antennas at a time as well as improve the spectral efficiency at the same time. TDD has been used for gaining beamforming which is a major part of massive MIMO, to gain its best improvement to transmit and receive pilot sequences. All the benefits are only possible if the channel state information or channel estimation is gained properly. The common methods to estimate channel matrix used so far is LS, MMSE and a linear version of MMSE also proposed in many research works. We have optimized these methods using genetic algorithm to minimize the mean squared error and finding the best channel matrix from existing algorithms with less computational complexity. Our simulation result has shown that the use of GA worked beautifully on existing algorithms in a Rayleigh slow fading channel and existence of Additive White Gaussian Noise. We found that the GA optimized LS is better than existing algorithms as GA provides optimal result in some few iterations in terms of MSE with respect to SNR and computational complexity.

Keywords : channel estimation, LMMSE, LS, MIMO, MMSE
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