Fast Channel Estimation Techniques for LTE Downlink Systems based on Fast Linear Toeplitz System Solver

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Abstract—LTE is defined as the 4G generation network providing high data rates. Channel estimation is important in the wireless system conception. Classical LMMSE channel estimation techniques require $O(N^3)$ floating operations and $O(N^2)$ memory locations ($N$ is the size of the channel autocorrelation). In this paper, we propose fast channel estimation techniques for LTE based on fast solver for linear Toeplitz system with reconstructible Cauchy-like structure. Proposed fast algorithms require only $O(N^2)$ floating operations and $O(N)$ memory locations. Performances of proposed fast algorithms are verified via Monte-Carlo MATLAB simulations.

Keywords—LTE; GSA; channel matrix autocorrelation; LMMSE.

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