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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