

ENHANCED V-BLAST FOR MIMO-OFDM SYSTEMS WITH NOVEL IDD

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ABSTRACT

Orthogonal frequency division multiplexing (OFDM) systems divide the entire channel into many narrow parallel sub-channels, increasing the symbol duration and reducing the inter-symbol interference (ISI) caused by the multipath. Multiple-input multiple-output (MIMO) systems make use of multiple antennas at the transmitter and receiver can exhibit a substantially higher spectral efficiency and improve the system capacity significantly. Therefore, the combination of MIMO and OFDM, which is called MIMO-OFDM, has emerged as a major candidate for the fourth-generation communications. First, in this paper, we introduce an enhanced vertical Bell Labs layered space-time (V-BLAST) receiver which takes the decision errors into account. Second, we propose a novel iterative detection and decoding (IDD) scheme for coded layered space-time architectures in MIMO-OFDM systems. For the iterative process, a low complexity demapper is developed by making use of both non-linear interference cancellation and linear minimum mean-square error filtering and a low complexity algorithm for LLR calculation also developed. Simulation results demonstrate that the proposed method achieves the optimal turbo-MIMO approach, while providing considerable reduction in latency and also considerable reduction in computational complexity

KEYWORDS: Iterative Detection and Decoding (IDD), Multiple-Input-Multiple-Output (MIMO), Orthogonal Frequency-Division Multiplexing (OFDM), Vertical Bell Labs Layered Space-Time (V-BLAST)