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Iterative Hybrid Decision-Feedback Equalization (HDFE) Based Single-Carrier IDMA Schemes

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Abstract:

A low complexity hybrid decision feedback equalization (HDFE) for single carrier interleave-division multiple-access SC-IDMA systems is considered for practical intersymbol interference (ISI) channels. HDFE filters and interference canceller (IC) are used in conjunction with channel coding to cancel the channel impairments from a received data and generate feedback symbols whose reliability increases iteratively. Moreover, the feedforward (FF) filter is implemented by Fast Fourier transforms (FFTs), which yields much lower computational complexity than equivalent structures, yet achieve the performance of such systems in time domain. Simulation results including comparisons and compatibilities with those of frequency domain equalization (FDE) SC-FDE-IDMA and multi-carrier OFDM-IDMA schemes, with cyclic prefixing (CP) and zero padding (ZP) techniques, show that the combination of HDFE and IC exhibits a reduction of the computational complexity and provides an efficient solution with good performance for IDMA systems in dispersive channels.

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