On Achieving Reduced Error Propagation Sensitivity in DFE Design via Convex Optimization

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Decision Feedback Equalization (DFE) is expected in digital TV receivers and other high error rate environments. Error propagation usually occurs in infrequent bursts. It is argued here that the minimum mean-square-error (MMSE) adaptation mechanism in the presence of error propagation will find a better answer than the solution computed in the absence of decision errors. This paper attempts to formalize this benefit during the design phase, by considering other (convex) performance measures than MSE assuming perfect decisions. After all, any such modified objective is just a proxy for determining the optimal error rate. It is known that error propagation is “enhanced” by large gains in the decision portion of the DFE portion. We consider a method to penalize these gains, but not in the unconstrained (perfect decision) MSE sense.