

Abstract Details

Title: Activity Detection Using Adaptive Decision Feedback Equalizers (DFE) in Optical Communication

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Abstract: The current paper, proposes an adaptive equalizer by integrating the fractional spaced equalizer (FSE) with decision feedback equalizer (DFE) for optical channel to remove the problem of pulse dispersion effect in optical link, in addition, for further improvement in the performance of the equalizer we propose adopting the activity detection guidance(ADG) with tap decoupling (TD) in the fractional spaced decision feedback equalizer (FSDFE) to get fruitful outcomes in the performance of the system without shortcomings. We propose a fractionally spaced decision feedback equalization (FSDFE) structure which replaces the symbol spaced feedback filter with a fractionally spaced feedback filter. We could improve the stability, the steady-state error performance and the convergence rate. As the impulse response of a typical optical link would have regions that are essentially zero, the employment of the activity detection scheme with Tap Decoupling would further enhance the steady-state error performance and convergence rate. The simulation results revealed that: the FSDFE with ADG and TD offers a superior performance than its counterpart without ADG and TD. Where, it offers improvement in the effectiveness of amplitude distortion. Moreover, as the impulse response of a typical optical link would have regions that are essentially zero, the employment of the ADG scheme would further enhances the steady-state error performance and convergence rate.

Keywords: I.S.I, DFE, FSE, FSDFE, ADFE, ADG and TD.