ADAPTIVE INTERFERENCE CANCELLATION USING COMMON−MODE INFORMATION IN DSL (ThuAmOR2)

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Abstract :

Exploiting the common−mode (CM) receive signal in wireline communication can yield significant improvements in terms of channel capacity compared to using only the differential−mode (DM) signal. Recently published, independent, scientific work proposed the employment of an adaptive CM−reference based interference canceller and reported performance improvements based on simulation results. Adaptive processing of correlated receive signals, however, bears the potential danger of cancelling the useful component − an undesired effect we will address. We present an analysis of the linear adaptive cancellation approach in this application. For a large class of practically relevant cases, it can be shown that a canceller, whose coefficients are adapted while the far−end transmitter is silent, yields a signal−to−noise−and−interference power ratio (SNIR) which is higher than the SNIR of the DM−only channel output. Moreover, the performance of a canceller with this tap−setting is close to the performance of the front−end that is optimum in the sense of maximising the SNIR at its output. Adaptation while the useful far−end signal is present yields a front−end whose output SNIR is considerably lower compared to the SNIR of the DM channel output.
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* Abstract : (cont.)	The results and their practical impact are demonstrated by an example.