

Elektrotechnik-Elektronik-Informationstechnik

EEI KOLLOQUIUM

Channel Coding for High-Speed Optical Communications – Status and Recent Advances Using Spatially Coupled Codes

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Channel coding has only been used in high-speed optical communications since 1988. Since then, coding technology has evolved significantly. This pertains not only to the codes themselves but also to encoder and decoder architectures. Modern high-speed optical communication systems require high-performing coding systems featuring the support of throughputs of 100 GBit/s or multiples thereof, low decoder power consumption and large net coding gains. Today, transmission systems with 100 to 400 GBit/s today typically use modern coding schemes with soft-decision iterative decoding. In this talk, we first review the general concepts of state-of-the-art coding techniques and then introduce the class of spatially coupled codes, whose construction is based on a superimposing a convolutional structure to existing channel codes. We highlight some recent research results, including optimization guidelines for low-complexity operation, evaluation of their performance at very low bit error rates for ultra-reliable communication, and burst erasure correction capabilities. Finally, we present some designs for high-speed communication systems affected by phase noise.