

Elektrotechnik-Elektronik-Informationstechnik

EEI KOLLOQUIUM

Design and Performance of Finite Length Rateless Codes

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Diskussionsleitung: Prof. Dr.-Ing. J. Huber

In this talk, rateless codes are discussed. These codes, also known as fountain codes, are excellently suited for erasure correction in packet-switched communication networks. Common design and analysis approaches are based on the assumption of infinite input word length, while here the focus is on codes with a finite (especially short to medium) length. These practical lengths enable low-delay applications and facilitate using the optimal maximum likelihood (ML) decoder. Considering that the required computational complexity becomes affordable in this case, the ML decoder with its outstanding erasure correction capabilities becomes almost imperative. Code designs are presented, the decoding complexity is assessed and tight bounds on the erasure correction performance are derived. More generally, the determination of the expected erasure correction performance is equivalent to the fundamental mathematical question of whether a system of designed random linear equations over finite fields can be partially or completely solved.