



KOLLOQUIUM

Institut für Elektrotechnik, Elektronik und Informationstechnik

Wireless multimedia turbo-transceiver design

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Cauerstraße 7/9, Hörsaal H5

Diskussionsleitung: Prof. Dr.-Ing. W. Koch

Since the end of the last century, when Marconi demonstrated the feasibility of radio transmissions, mankind has endeavoured to fulfill the dream of flawless wireless multimedia telecommunications. In fact, virtually being with someone, anywhere, at any time at the push of a dialling key is a concept that ultimately leads to the impression of “tele-presence” while communicating. Naturally, the provision of these “tele-presence” services requires a further quantum leap from the current state-of-the-art represented by the popular mobile telephone.

The presentation commences with a video-clip, interpreting the concept of “telepresence” and outlines the fundamental problems and limitations encountered in wireless multimedia communications systems in simple conceptual, yet tangible terms with the aid of multimedia demonstrations.

The rest of the presentation focusses on new turbo-transceiver design examples which take some fundamental requirements of multimedia communications into account. Specifically, a turbo-detection aided serially concatenated inner Trellis Coded Modulation (TCM) scheme is combined with three different outer codes, namely with a Reversible Variable Length Code (RVLC), a Non-Systematic Convolutional (NSC) code or a Low Density Parity Check (LDPC) code. These three outer constituent codes are comparatively studied in the context of an MPEG4 videophone transceiver. These serially concatenated schemes are also compared to a stand-alone LDPC coded MPEG4 videophone system at the same effective overall coding rate. The performance of the proposed schemes is evaluated when communicating over uncorrelated Rayleigh fading channels. It was found that the serially concatenated TCM-NSC scheme was the most attractive one in terms of coding gain and decoding complexity among all the schemes considered in the context of the MPEG4 videophone transceiver.

The lecture is concluded by highlighting a range of system design guidelines pertinent in the current turbo-transceiver era.