

Short Course da VTS/ComSoc

(Distinguished Lecturer Tour)

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Iterative Processing for Cooperative Communications Allowing Intra-Link Errors

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ABSTRACT

This talk starts by reviewing our previous work for MIMO turbo equalization for broadband single carrier signalling. Then, a simple structure that combines turbo equalization and decoding of correlated sources in multipath-rich multiuser Rayleigh fading multiple access channels, where the correlation between the sources is exploited by vertical iterations between the decoders. The bit-flipping model with a flipping probability p is used to express the correlation. This talk focuses on a very coding technique for relay systems without equalization. In relay systems, the probability of error occurring in the source-relay link can be viewed as representing correlation between the source and the relay. This talk proposes a simple iterative decoding technique, accumulator-assisted distributed turbo coding using 2-state (memory-1) convolutional codes, where the correlation knowledge between the source and the relay is estimated, and exploited in the destination. Some theoretical basics supporting the techniques presented in this lecture, such as EXIT chart analysis, EXIT-based code design, and convergence property and mutual information will be provided.

BIO

Tad Matsumoto received his Ph.D. from Keio University, Yokohama, Japan, in 1991, in electrical engineering. He joined NTT in Apr. 1980, in July 1992, he transferred to NTT DoCoMo, in Apr. 1994, he transferred to NTT America, and in Mar. 1996, he returned to NTT DoCoMo, where he served as a Head of the Radio Signal Processing Laboratory. In March 2002, he moved to University of Oulu, Finland, where he served as a Professor at Centre for Wireless Communications. In 2006, he served as a Visiting Professor at Ilmenau University of Technology, Ilmenau, Germany. Since Apr. 2007, he has been serving as a Professor at Japan Advanced Institute of Science and Technology, Japan, while also keeping the position at University of Oulu. Prof. Matsumoto is a recipient of IEEE VTS Outstanding Service Award (2001), Nokia Foundation Visiting Fellow Scholarship Award (2002), IEEE Japan Council Award for Distinguished Service to the Society (2006), IEEE Vehicular Technology Society James R. Evans Avant Garde Award (2006), and Thuringen State Research Award for Advanced Applied Science (2006), 2007 Best Paper Award of Institute of Electrical, Communication, and Information Engineers of Japan (2008), Telecom System Technology Award by the Telecommunications Advancement Foundation (2009), and IEEE Communication Letters Exemplifying Reviewer Award (2011). He is a Fellow of IEEE and a Member of IEICE. He has been appointed as an IEEE Distinguished Lecturer during the period 2011-2013.