A Suitable Sub optimum Soft decision Decoding Algorithm for Block codes:

Ms. Samikhya Dash, Prof. Saswat Chakrabarti

GS.Sanyal School of Telecommunications, IIT, Kharagpur, West Bengal, India

ABSTRACT

It has been a challenge for the code designers to design a decoding algorithm which not only provides a good BER performance but also involves less computational intensity. The Trellis based Maximum A posteriori Probability(MAP) decoding provides a good BER performance but it is very much computationally intensive. This paper suggests an efficient soft decision non Trellis based decoding algorithm with less complexity for block codes. Here we have considered a soft output Chase-2 decoding algorithm for decoding of popular Block codes like Hamming codes and Reed-Muller code. We also compared the same decoding algorithm with the conventional algebraic decoding and also with the soft output optimum decoding ie Maximum Likelihood (ML) decoding in terms of the coding gain and complexity. The detail description of the Chase-2 decoding and it's analysis will be given in the full paper. We got a performance gain of 0.5dB over the hard decision decoding to achieve BER 10⁻³ in AWGN using this .The study of the Chase-2 algorithm as applied to the decoding of the a $(16,11)^2$ Reed- Muller

Product code is currently being investigated. We will justify through results why we should go for this sub optimum Chase-2 decoding for powerful Block based coding schemes like Turbo Product Codes(TPCs) in the full paper.

Index Terms- Hamming codes, algebraic decoding, Reed-Muller codes, soft decision decoding, Chase decoding, Maximum Likelihood decoding, optimum decoding, Product codes, Turbo Product Code(TPCs).