

Master Internship Project at the ETIS Group, ENSEA

Title:

Efficiency estimation of H-ARQ retransmission schemes based on sparse-graph codes

Description:

Retransmission protocols are helpful when the transmission takes place over time-varying channels, and they are widely used in wireless communication systems. Such transmission schemes mostly use iterative channel coding techniques, owing to their close-to-capacity performance and a low decoding complexity.

The goal of this study is to give an approximation of performances (i.e. average throughput and delay) of the H-ARQ retransmission protocol based on sparse-graph codes. By focusing on binary memoryless symmetric channels, we will use the scaling approach [1] to estimate the performance of given sparse-graph code family and will combine it with the result presented by Sesia et al. [2] for retransmission schemes.

Knowledge required:

- basic knowledge of sparse-graph codes (LDPC codes, turbo codes, ...)
- knowledge of retransmission protocols (ARQ, Hybrid ARQ, Incremental Redundancy H-ARQ)
- probability theory
- programming skills

References:

- [1] A. Amraoui, “Asymptotic and Finite-Length Optimization of LDPC Codes”, PhD Thesis, EPFL, Switzerland, 2006, *url*= http://biblion.epfl.ch/EPFL/theses/2006/3558/EPFL_TH3558.pdf
- [2] S. Sesia, G.Caire, G. Vivier, “Incremental redundancy hybrid ARQ schemes based on low-density parity-check codes”, IEEE transactions on communications, 2004, vol.52, n°8, pp. 1311-1321, *url* = <http://www.eurecom.fr/util/publidownload.en.htm?id=1203> (draft)

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