

## Low Density Parity Check Codes

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**Abstract :** The field of error correcting codes has been revolutionized by the introduction of iteratively decoded codes. Among these, LDPC codes are now a preferred solution thanks to their remarkable performance and low complexity. The binary version of LDPC codes showed even better performance, although it's decoding introduced greater complexity. This thesis studies the performance of binary LDPC codes using simplified weighted decisions. Information is transported between a transmitter and a receiver by digital transmission systems, either by propagating over a radio channel or also by using a transmission medium such as the transmission line. The purpose of the transmission system is then to carry the information from the transmitter to the receiver as reliably as possible. These codes have not generated enough interest within the coding theory community. This forgetfulness will last until the introduction of Turbo-codes and the iterative principle. Then it was proposed to adopt Pearl's Belief Propagation (BP) algorithm for decoding these codes. Subsequently, Luby introduced irregular LDPC codes characterized by a parity check matrix. And finally, we study simplifications on binary LDPC codes. Thus, we propose a method to make the exact calculation of the APP simpler. This method leads to simplifying the implementation of the system.

**Keywords :** LDPC, parity check matrix, 5G, BER, SNR

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