The Implementation of Low－Density Parity－Check Decoding

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ABSTRACT

The error control coding is different from the source coding in general. In the transmission, the data are degraded by unreliable transmit media or interfered with the external factor, the error control coding is employed to correct errors as much as possible. Low density parity check (LDPC) code is a kind of powerful error control coding. Data encoded with LDPC code are sent with lower power and then could be received correctly with LDPC decoder employed. In this thesis, the sum-product algorithm of LDPC code is implemented by VHDL, which employs some mathematical functions and float-point calculation packages. Over a noisy simulation transmission channel, interfered data are detected in such a decoding algorithm and then decoded. The results of C language simulation and VHDL language simulation are compared. The implementation of this algorithm is downloaded to an FPGA development system. Such an implementation in FPGA has been verified to correct interfered data, and then these corrected data are sent back to a personal computer via RS232 interface

Keywords : LDPC code ; Hyperbolic ; Error control coding ; SPA algorithm

Table of Contents

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