The Study of Rational Function BCH and Reed-Solomon Codes

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ABSTRACT

Due to the development of digital technology, the demands of data transmission and connecting people are improved more and more. Communication systems are researched and developed to serve for higher demands not only speed but also quality. Error control coding is one of related research fields that improve quality for information systems. In this work, a new bound on the minimum distance of non-Bose-Chaudhuri-Hocquenghm (BCH) codes and Reed-Solomon (RS) codes based on "Rational function" is presented. This bound improve upon the BCH bound, and for some case upon the Hartmann-Tzeng (HT) bound. The main research's purpose is to improve the capability of correcting errors and erasures based on the new bound. Both modified Berlekamp Algorithm (BA) and Euclidean Algorithm (EA) are presented to perform all necessary decoding steps.

Keywords: Non-BCH codes RS codes Rational function BCH bound HT bound Berlekamp algorithm Euclidean algorithm

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