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Block Gauss elimination approach to construction of the generator matrices of quasi-cycle LDPC codes. (Chinese. English summary) [Zbl 1199.94111]

Summary: A novel Block Gauss Elimination (BGE) approach to construction of the generator matrix of quasi-cyclic low density parity check (QC-LDPC) codes is proposed. In order to calculate the inverse matrix of a QC-LDPC matrix, the generator polynomials are adopted to express the cyclic extended matrices in the QC-LDPC matrix. In this way, the dimension of the matrix to be inversed is greatly reduced. Moreover, when dimension of the extended matrix of the parity check matrix of a QC-LDPC code is a prime number, approaches for judging whether the matrix is invertible and further speeding up the search in the process of the BGE are proposed. Analysis and simulation results show that the present approach not only decrease the memory requirement for constructing the generator matrix of a QC-LDPC code but also reduces the computation complexity compared with the usual Gauss elimination method.

MSC:
94B15 Cyclic codes
65F30 Other matrix algorithms (MSC2010)

Keywords:
QC-LDPC code; generator matrix; block Gauss elimination approach

Software:
QC-LDPC