عنوان مقاله:

An algebraic construction of QC-LDPC codes based on powers of primitive elements in a finite field and free of small ETSs

محل انتشار:

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خلاصه مقاله:

An (a,b) elementary trapping set (ETS), where a and b denote the size and the number of unsatisfied check nodes in the ETS, influences the performance of low-density parity-check (LDPC) codes. The smallest size of an ETS in LDPC codes with column weight 3 and girth 6 is 4. In this paper, we concentrate on a well-known algebraic-based construction of girth-6 QC-LDPC codes based on powers of a primitive element in a finite field $\mathbb{F}_q$. For this structure, we provide the sufficient conditions to obtain $3\times n$ submatrices of an exponent matrix in constructing girth-6 QC-LDPC codes whose ETSs have the size of at least 5. For structures on finite field $\mathbb{F}_q$, where q is a power of 2, all non-isomorphic $3\times n$ submatrices of the exponent matrix which yield QC-LDPC codes free of small ETSs are presented.

کلمات کلیدی:

QC-LDPC codes, girth, Tanner graph, elementary trapping set

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