

A CLASS OF STRUCTURED QUASI-CYCLIC LDPC CODES BASED ON PLANAR DIFFERENCE FAMILIES

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ABSTRACT

This paper is devoted to introduce a special classes of (QC-LDPC) with very restricted code parameters based on planar difference families. Such difference families could be obtained by numerical analysis and computer programs. The resulting codes have parity check matrices with column-weight greater than three, at least no 4-cycle and approximately full rank. It can be noted that the construction based on planar difference families exhibits more flexibility than that based on difference sets in terms of length and code rate selections. Besides, the more increasing in the column-weights of parity check matrices of QC-LDPC codes, the more improvement in the minimum distances of them. Simulation results show that over the additive white Gaussian noise channel, these codes could outperform their randomly constructed counterparts.

KEYWORDS: LDPC Codes, Quasi-Cyclic Codes, Planar Difference Family, Girth, Minimum Distance