电子与信息学报 » 2011, Vol. 33 » Issue (12) :2935-2941 DOI: 10.3724/SP.J.1146.2011.00483

一种高性能全分集LDPC码的构造方法

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High Performance Full Diversity LDPC Codes Construction Algorithm

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摘要 块衰落信道上全分集LDPC的构造与性能分析成为近期研究的热点。ML译码算法下全分集LDPC码可以通过设计列满秩的校验子矩阵来实现。然而，基于ML准则的全分集码字，采用迭代译码算法时，不能保证全分集。因此，该文通过设计特定结构的校验矩阵，实现了在迭代译码算法下能取得全分集的LDPC码，分析了其密度演化过程。 在此基础上，进一步研究了全分集LDPC码字结构与性能的关系，提出了提高全分集LDPC码编码增益的方法。仿真结果表明，该文构造的LDPC码不仅能够取得全分集，并且具有较高的编码增益。

关键词： 低密度奇偶校验码 块衰落 全分集 分集阶数 编码增益

Abstract： Full diversity Low Density Parity Check (LDPC) codes construction is the hot spot in LDPC field at present. Traditional construction algorithm designs column full rank check submatrix to realize full diversity LDPC codes under ML decoding algorithm. However, under BP decoding algorithm, the LDPC codes designed based on ML principle can not guarantee full diversity. In this paper, the construction method of full diversity LDPC codes under BP decoding algorithm is first put forward by changing the structure of parity check matrix, then, density propagetion process of full diversity LDPC codes is analyzed. Finally, the relationship between the structure of full diversity LDPC codes and the coding gain is researched, and the algorithm to improve coding gain is given. Simulation results show that the proposed algthriom can not only achieve full diversity, but also get better performace than random constructed LDPC codes.

Keywords： Low Density Parity Check (LDPC) code Block-fading Full diversity Diversity gain Coding gain

Received 2011-05-23;

本文基金:

国家自然科学基金(60972049)和浙江省自然科学基金(Y1100579)资助课题

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引用本文:

郭锐, 胡方宁, 刘济林.一种高性能全分集LDPC码的构造方法[J] 电子与信息学报, 2011,V33(12): 2935-2941

Guo Rui, Hu Fang-Ning, Liu Ji-Lin.High Performance Full Diversity LDPC Codes Construction Algorithm[J] , 2011,V33(12): 2935-2941

链接本文:

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2011.00483 或 http://jeit.ie.ac.cn/CN/Y2011/V33/I12/2935