

多符号差分球形译码在无线传感器网络分布式检测中的应用研究

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摘要:

在无线传感器网络分布式检测中, 信道条件复杂, 难于估计。比较相关检测, 差分检测的优势是不需要信道估计, 但总是付出一定的性能损失。为了缩短这一差距, 本文提出多符号差分检测, 并结合低复杂度球形译码算法, 对多符号差分球形检测的迭代搜索过程进行了详细分析。算法检测性能和复杂度的分析表明, 该检测算法不仅能有效降低计算复杂度, 而且能保证较好的检测性能。结果证明该算法可作为一种有效检测算法应用于无线传感器网络分布式检测中。

关键词: 无线传感器网络; 分布式检测; 多符号差分检测; 多符号差分球形译码

Multi-symbol Differential Sphere Decoding for Distributed Detections in Wireless Sensor Networks

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Abstract:

In distributed detections of wireless sensor networks, the channel conditions are complicated and difficult to be estimated. Compared with correlation detection, differential detection has the advantage of needing no channel estimations, but a certain performance loss is always paid. To narrow this performance gap, this paper puts forward multi-symbol differential detection, combined with low-complexity sphere decoding algorithm. A detailed analysis of multi-symbol differential sphere decoding iterative search process is presented. The detection performance and complexity analysis show, the proposed detection algorithm can not only reduce the computational complexity, but also achieve good detection performance. The results demonstrate that it can be an effective detection algorithm for distributed detection systems of wireless sensor networks.

Keywords: wireless sensor networks (WSNs); distributed detections; multi-symbol differential detection; multi-symbol differential sphere decoding (MSDSD)

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