



基于FFT并行搜索伪码和频偏的快速捕获新方法

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A New Fast Acquisition Method of Parallel Search Pseudo-code and Frequency Offset Based on FFT

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摘要 无线传感网中节点普遍受资源、成本、功耗的限制,使得节点间通信需满足低资源消耗、大载波频偏、低物理层开销等要求。该文提出利用一套FFT结构并行搜索伪码相位和载波频偏的快速捕获新方法(PSPF-FFT),通过差分处理消除载波频偏影响先进行伪码相位捕获然后再进行频偏纠正,以牺牲少量信噪比为代价来换取资源、平均捕获时间的减少。最后理论分析和仿真验证了新的捕获方法的实用性,与相同平均捕获时间、资源开销的捕获方法相比,PSPF-FFT捕获方法有着明显的性能优势。

关键词: 无线传感器网络 直接序列扩频 伪码捕获 快速傅里叶变换 载波频偏纠正

Abstract: The communication between nodes is designed to meet the low consumption of resources, large carrier frequency offset, low-cost physical layer requirements because nodes are generally subject to resource, cost and power consumption constraints in wireless sensor networks. This paper presents a new fast acquisition method which uses Parallel Search Pseudo-code phase and Frequency offset based on FFT (PSPF-FFT). It firstly searches the pseudo-code phase after differential processing of the signal, then it searches frequency offset after pseudo-code phase is synchronized. The reduction of resource and average acquisition time can be achieved by sacrificing a slight performance of signal-to-noise ratio (SNR). The theoretical analysis and simulation prove the practicability of the new acquisition method. The proposed method in this paper has obvious performance advantages compared to the traditional method with the same resource and average acquisition time consumption.

Keywords: Wireless sensor networks DSSS Pseudo-code acquisition FFT Frequency offset correct

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