

算法研究

宽带MFSK/DFH系统抗部分频带噪声干扰性能分析

董彬虹, 程乙钊, 王达

电子科技大学通信抗干扰技术国家级重点实验室

摘要:

本文提出一种宽带MFSK/DFH系统模型, 与常规差分跳频系统相比, 在跳频点数一定条件下, 通过增加多进制编码器复杂度, 提高编码增益的方法提高系统抗干扰性能。对基于FFT的宽带MFSK/DFH系统接收机抗干扰性能进行了理论分析和计算机仿真验证。结果表明: 在相同条件下, 提出方法通过增加多进制编码器约束长度提高了系统抗干扰能力, 实现方法简单有效, 具有一定的实际应用价值。

关键词: G函数; 多进制编码器; 约束长度; 状态网格图; 抗干扰

Performance analysis of wideband MFSK/DFH system with partial-band noise jamming

DONG Bin-Hong, CHENG Yi-Zhao, WANG Da

National Key Laboratory of Science and Technology on Communications, University of Electronic Science and Technology of China Chengdu

Abstract:

Originally developed for HF communications in military applications, DFH systems possess high spectral efficiency features. As a combination of frequency hopping, modulation and coding techniques with G function, DFH technology can not only effectively enhance the transmission rate of the HF communication system but also effectively combat multipath fading and interference which restricts HF communication development. To improve the DFH systems flexibility and capacity, in this paper, we propose a wideband MFSK/DFH system model. Unlike in traditional DFH system where the anti-jamming performance is determined by the number of available frequency choices, in MFSK/DFH, a G function constructing method based on state trellis diagram was presented which coding gain and system capacity can be improved by increasing the coding complexity. The theoretical analysis and simulation results of symbol error rate for the FFT based receiver in AWGN with partial-band noise jamming are also given. The results of a more detailed analysis show that the proposed method improves anti-jamming performance by increasing the coding complexity. The implementation is simple and has some practical value.

Keywords: G function M-ary encoder constraint length trellis and graph for status; anti-jamming

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通讯作者:

作者简介:

作者Email: bhdong@uestc.edu.cn

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