

FFH/BFSK选择分集合并接收机在部分频带干扰Nakagami- m 信道下的性能分析

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Performance Analysis of FFH/BFSK Receivers with Selection Combining over Nakagami- m Fading Channels with Partial-Band Jamming

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摘要

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摘要 快速跳频通信系统选择分集合并接收机可以有效减轻干扰及衰落对系统带来的性能损伤。该文给出了快速跳频BFSK系统在部分频带干扰下的选择分集合并接收机模型, 并对该接收机在同时存在部分频带干扰以及加性高斯白噪声的非频率选择性Nakagami- m 衰落信道下的性能进行了推导, 给出了误码率的闭合表达式。最后进行了仿真验证, 仿真结果与理论分析结果完全一致。分析表明: 具有高分集度的选择分集合并接收机受干扰影响较小; 在干扰功率较大时, 其性能要好于其它几种分集合并接收机; 在一定的信道条件下, 存在一个最佳分集度。最后针对选择分集合并接收机在弱干扰信号下的性能不足, 提出相应的改进措施。

关键词: 跳频通信 Nakagami- m 衰落 选择分集合并 部分频带干扰

Abstract: Selection Combining (SC) receiver for Fast Frequency-Hopped Binary Frequency-Shift-Keying (FFH/ BFSK) communication systems can reduce the performance degradation caused by interference. The SC receiver model is proposed in the present of Partial Band Noise Jamming (PBNJ). The bit-error probability is evaluated for the receiver over a frequency-nonselective slowly Nakagami- m fading channel with PBNJ and additive white Gaussian noise. A closed-form error probability expression is given. It is shown that the SC receiver with high diversity order is immune to PBNJ and it achieves better performance comparing to several other combining receivers when the jamming power is strong. Under certain channel conditions, there is an optimal diversity order. An adaptive scheme is proposed for improving the performance of SC receiver when the jamming power decreases.

Keywords: Frequency hopping communication Nakagami- m fading Selection Combining (SC) Partial Band Noise Jamming (PBNJ)

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