

论文与技术报告

多元位置随机极性CP-EBPSK调制解调器研究

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摘要:

为改善随机极性的连续相位扩展二元相移键控(Extended Binary Phase Shift Keying with Continuous Phase, CP-EBPSK)调制信号的频谱利用率, 提出了一种多元位置随机极性CP-EBPSK调制方式。阐述了多元位置随机极性CP-EBPSK调制原理。在数字冲击滤波器的基础上, 分别给出了基于多路判决方式、贪婪判决方式和合理判决方式的解调器, 并通过仿真对比和分析了CP-EBPSK调制、随机极性CP-EBPSK调制和多元位置随机极性CP-EBPSK调制的功率谱、-60dB带宽、频谱利用率和解调性能。仿真结果表明: 1)在频谱结构不变的条件下, 新的调制方式可使信息传输速率和频谱利用率成倍提高; 2)若以bps/Hz/SNR(dB)为综合指标, CP-EBPSK系统为 1.18×10^{-3} , 随机极性CP-EBPSK系统为7.01, 而新的调制解调系统为13.8。

关键词: 连续相位扩展二元相移键控调制; 频谱利用率; 数字冲击滤波器; 多路判决; 贪婪判决; 合理判决

Research on M-ary CP-EBPSK Modem with Random-polar

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Abstract:

In order to improve the spectrum efficiency of random-polar modulated Extended Binary Phase Shift Keying with Continuous Phase (CP-EBPSK), a random-polar and M-ary CP-EBPSK modulation is proposed. The modulation principle of random-polar and M-ary CP-EBPSK is demonstrated. Based on the digital impacting filter, the demodulator on the basis of Multi-path decision method, greedy decision method and rational decision method is presented, respectively. The contrast and analysis of the power spectrum, the -60dB bandwidth, the spectral efficiency, and the demodulation performance among the CP-EBPSK, random-polar modulated CP-EBPSK, and the proposed modulation, are carried out. Simulation results show that: 1) under the premise of remaining the same spectral structure, the proposed modulation method can multiple the information transmission rate and spectral efficiency; 2) if taking bps/Hz/SNR(dB) as comprehensive indicator, CP-EBPSK is about 1.18×10^{-3} , random-polar modulated CP-EBPSK is about 7.01, and the proposed modem is 13.8.

Keywords: Extended Binary Phase Shift Keying with Continuous Phase; spectrum efficiency; digital impacting filter; Multi path decision; greedy decision; rational decision

收稿日期 2012-07-24 修回日期 2012-10-31 网络版发布日期 2013-01-25

DOI:

基金项目:

国家自然科学基金项目“不对称二元调制信号的增强”(60872075)资助

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