

论文与技术报告

用于多路MCP-EBPSK信号解调的冲击滤波器组设计

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摘要:

修正的随机极性连续相位扩展的二元相移键控调制(MCP-EBPSK)通过随机化调制指数的符号,并加入功率谱调节系数,进一步降低了连续相位扩展的二元相移键控(CP-EBPSK)调制信号功率谱中的线谱分量,使得功率谱占用带宽更窄,信息传输更加的高效高速.多载波作为高频谱利用率的复用调制方式,与MCP-EBPSK结合势必会带来更高的系统性能,因此本文对用于解调单路MCP-EBPSK信号的冲击滤波器进行初步改进,通过添加陷波零点来抑制旁路干扰,设计出带陷波的冲击滤波器组.引入量子粒子群优化算法对加入陷波的冲击滤波器组进行优化得到滤波器组系数,仿真显示即使时频混叠的子载波间不满足正交关系,利用各冲击滤波器中心频率处极陡峭的陷波选频特性依然可以实现各子载波的正确解调.因此,设计的冲击滤波器组可以用于子载波无保护间隔的多路MCP-EBPSK信号解调.

关键词: MCP-EBPSK调制; 高频谱利用率; 多载波; 冲击滤波器组

The impacting filter bank design for MCP-EBPSK multicarrier demodulation

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Abstract:

The modified pseudo-random extended binary phase shift keying with continuous phase (MCP-EBPSK) could effectively reduce the spectral line compared with the continuous phase extended BPSK (CP-EBPSK), which could narrow the power spectrum by adding the modified coefficients and randomizing the sign of the modulation index of CP-EBPSK, finally realized the efficient and high data rate transmission. Multiplexing as a high spectral efficiency technique, combined with the MCP-EBPSK would certainly bring better performance. In this paper we improved the impacting filter and designed the filter bank by adding zeros to the impacting filters at the notch frequencies to depress the inter-channel interference(ICI). Use the QPSO (Quantum-behaved Particle Swarm Optimization) algorithm to obtain the filter bank's parameters, the simulation shown that though the subcarriers were time-frequency aliasing and nonorthogonal, the impacting filter bank could separate the composite signal and demodulated properly by its narrow notch-frequency-selecting characteristic near the center frequency. So the designed filter bank could demodulated the multi-channel MCP-EBPSK signal.

Keywords: MCP-EBPSK modulation high spectrum utilization multicarrier impacting filter bank

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