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Journal of Shanghai University (Natural Science Edition)
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上海大学学报(自然科学版) » 2010, Vol. 16 » Issue (4) :331-335 DOI:
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甚小线性调频键控调制波形的正弦基拟合优化

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Optimization of Very Minimum Chirp Keying Modulation Waveforms Based on Sinusoi Basis Fitting

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摘要

甚小线性调频键控(very minimum chirp keying,VMCK）是一种高效的超窄带调制技术，具有窄带宽占用、强边带抑制、数据传输效率高等优点.但是，从VMCK的表达式不能得出其频谱结构的解析解，难以对信号进行进一步分析和优化.基于数值拟合原理，提出一种基于正弦基拟合分解的VMCK优化方案.理论分析和仿真结果表明，该方案可成功去除VMCK谐波线谱，得到带宽更窄、边带抑制更强的VMCK波形，信号的解调性能也可以得到进一步增强.

关键词： 甚小线性调频键控；正弦基拟合；波形优化

Abstract:

Very minimum chirp keying (VMCK) is a novel ultra narrow band modulation method with the advantages of narrow band occupancy, intensive sideband suppression, and high transmission efficiency. However, since an analytical solution of the VMCK spectrum cannot be obtained directly, further optimization is limited. This paper presents a VMCK modulation optimization scheme based on sinusoidal basis fitting. The theoretical analysis and simulation show that the proposed scheme can successfully remove harmonic spectral lines and obtain an optimized VMCK waveform with narrower bandwidth and lower sidebands, and good demodulation performance.

Keywords: very minimum chirp keying (VMCK); sinusoidal basis fitting; waveform optimization

收稿日期: 2009-07-03;

基金资助:

国家自然科学基金资助项目（60872021）；上海市重点学科建设资助项目（S30108）；上海市科委重点实验室资助项目（08DZ2231100）

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引用本文:

.甚小线性调频键控调制波形的正弦基拟合优化[J] 上海大学学报(自然科学版), 2010,V16(4): 331-335

.Optimization of Very Minimum Chirp Keying Modulation Waveforms Based on Sinusoidal Basis Fitting[J] J.Shanghai University (Natural Science Edition), 2010,V16(4): 331-335

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