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算法研究

一种新型的基于块自适应滤波的MSK信号解调技术

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摘要：

本文针对MSK调制信号在军用和民用领域都得到了广泛应用的这一事实，首先简单地分析了MSK信号非相干解调性能和差分解调性能的不足。然后根据MSK数字调制信号的特点，将频域块自适应滤波技术和码元FFT求模判决算法相结合，提出了一种新型的MSK信号数字解调算法。最后在详细阐述新型MSK信号解调算法的基础上，利用计算机基于蒙特卡洛方法对新算法的解调性能进行了性能仿真，并对仿真结果进行了较为详细的分析。计算机仿真结果表明该新算法不仅简单有效，而且对噪声有很好的抑制作用。与经典的非相干解调和差分解调相比，该新算法具有较低的解调误比特率和较低的频偏敏感度，并且解调性能得到了明显的提高，具有一定的实际应用价值。

关键词： MSK调制； 频域块自适应； 数字解调；误码率

A new demodulation technology of MSK signal Based on frequency-domain block adaptive filtering

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Abstract:

To the MSK modulation applied widely in civil and military field, the shortage of the demodulation performance to MSK modulation signal is firstly analyzed on the incoherent demodulation and the differential phase demodulation in brief. Then according to the characteristic of MSK digital modulation signal, a new technology of MSK signal digital demodulation, which associated the frequency-domain block adaptive filtering algorithm with encode-element decision algorithm through MOD acquired by FFT, is represented theoretically. After the fundamental principle of the demodulation algorithm being set forth in detail, the demodulation performance of the algorithm is simulated and analyzed with the results of monte carlo method by the computer. The results of computer simulation show that the algorithm is concise and effective, and has the function of suppression on the background noise at the same time. Compared with incoherent demodulation and the differential phase demodulation, the new algorithm improves the demodulation performance is improved obviously, and not only has lower bit-error-ratio but also has lower sensitivity to frequency deviation. The algorithm has certain application value to the MSK signal digital demodulation in practice.

Keywords: MSK modulation； Block-FFT adaptive； data demodulation；BER

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