

基于IEEE 802.15.4的低复杂度OQPSK全数字调制方法

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摘要：

本文深入研究IEEE 802.15.4协议中经半正弦函数成型的OQPSK调制信号中相邻相位的变化特征，为便于调制算法的全数字电路实现，对基带调制算法进行了数字化处理。同时，本文提出一种循环移位和查找表相结合的方法降低电路复杂度，有效减小了调制器的实现成本。仿真及FPGA综合结果表明：该方法简单易行，logic elements和memory bits仅分别为52和72，满足无线传感网络低成本的要求。

关键词：IEEE802.15.4；OQPSK；半正弦成型函数；全数字调制；无线传感网络

Low-complexity Full-Digital Method of OQPSK modulation based on IEEE 802.15.4

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Abstract:

In this paper, we deep researched on the adjacent phase characteristics of the OQPSK modulation signals by half-sine shape in IEEE 802.15.4 protocol. We digitized the baseband modulation algorithm in order to facilitate full digital hardware implement of modulation algorithm. At the same time, we proposed an effective method of cyclic shift and looking-up table, which could reduce the circuit complexity and greatly simplify the circuit. The hardware cost of modulator would be effectively reduced. The simulation and FPGA synthesis results show that the method proposed has the advantages of easy to realization. Moreover, the cost is greatly reduced because the number of logic elements and memory bits is only 52 and 72, respectively. The method can effectively meet the requirements of lower cost in wireless sensor networks.

Keywords: IEEE802.15.4; half-sine shaping function; offset quadrature phase-shift keying; full-digital modulation; wireless sensor network

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