

论文

脉冲展宽水下激光PPM信号解调方法的研究

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摘要:

水下激光脉位调制 (PPM) 通信中, 脉冲的时域展宽容易导致时隙串扰, 进而严重影响通信质量。针对这一问题, 在研究光PPM取样信号最大似然时隙 (MLC) 解调方法和最大累加计数样值 (MAS) 解调方法的基础上, 根据激光脉冲水下传输后其能量分布特点, 对MAS解调方法进行修正。通过计算机模拟仿真, 分析比较解调方法的性能特点, 证明了MAS解调方法修正后, 时隙串扰情况下的PPM信号解调性能明显改善, 最后考察了计数样值数的选取对解调性能的影响, 对水下激光无线通信的应用具有重要的实际意义。

关键词:

Study on Demodulation Methods for Underwater Laser Stretched Pulse PPM Signal

Abstract:

In underwater laser PPM (pulse position modulation) communication, the pulse time-domain extension can easily lead to inter-slot interference, which may seriously affect the quality of communication. In terms of the problem, methods for sampling signal demodulation such as MLC (maximum likelihood searching for chips) and MAS (maximum accumulating count searching for samples) have been studied. Then MAS demodulation method has been corrected according to the energy distribution of the laser pulse after propagating underwater. By PC analogue simulation, analytical comparison is given to the performance characteristics of the above demodulation methods, and it proves that PPM demodulation performance under inter-slot interference condition has greatly improved after the correction of MAS demodulation method. Finally, the influence of the choice of the calculating samples number on PPM demodulation performance are reviewed, which is of much practical significance to the underwater wireless laser communication.

Keywords:

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