

论文

光纤通信系统中CSRZ码多级相位调制技术的研究

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摘要:

研究了一种基于CSRZ(载波抑制归零码)的多级相位调制技术在光纤通信系统中的应用.分析了CSRZ、DQPSK(正交差分相移键控)、8DPSK(八差分相移键控)调制格式的特征,理论上推导出了CSRZ-DQPSK和CSRZ-8DPSK的调制解调原理公式,给出了其调制解调方式及具体过程的实现,并用Matlab仿真得到了CSRZ、CSRZ-DQPSK和CSRZ-8DPSK调制后的频谱图和解调后的眼图.性能分析的结果表明,CSRZ-DQPSK和CSRZ-8DPSK作为新型多级相位调制格式,具有更窄的频谱宽度、更高的频谱效率,因此具有更高的色散、非线性损耗容限和更低的信道间串扰,解调后的眼图性能也很好,有望成为下一代光纤通信系统的首选传输码型.

关键词: 光纤通信 载波抑制归零码 多级相位调制

Study of Multi-phase Modulation Technology Based on CSRZ Format in Optical Fiber Communication*

Zhang Xia

Abstract:

The possible application of multi-phase modulation technology in optical fiber communication based on Carrier-Suppressed Return-to-Zero (CSRZ) format was studied. With analyzing the characteristics of CSRZ format, Differential Quadrature Phase Shift Keying (DQPSK) and Eight Differential Phase Shift Keying (8DPSK), formula of CSRZ-DQPSK and CSRZ-8DPSK modem methods was got and the methods in their specific achieving processes were presented. Spectra based on CSRZ, CSRZ-DQPSK and CSRZ-8DPSK modulation methods and their eye diagrams following demodulator using Matlab simulation were obtained. The results show that the CSRZ-DQPSK and CSRZ-8DPSK modulation methods, as the possible new methods, had narrower spectra with higher spectrum efficiency. Their performance of eye diagrams was also much satisfactory after demodulation, suggesting some possible applications of the methods in the next generation of optical fiber communication.

Keywords: Fiber communication CSRZ Multi-phase modulation

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