N EFFICIENT METHOD TO DESIGN THE OPTICAL COMMUNICATION SYSTEMS WITH CHIRPED NRZ SIGNAL

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ABSTRACT

IN OPTICAL COMMUNICATION SYSTEM, NON-RETURN-TO-ZERO (NRZ) SIGNAL PULSE CAN BE CHIRPED SO THAT SIGNAL SPECTRUM IS BROADENED AND PULSE WIDTH IS SERIOUSLY BROADENED DURING TRANSMISS -ION. THESE EFFECTS CAN REDUCE THE IMPACT OF FIBER NONLINEARITIES AND BETTER SIGNAL QUALIT -Y CAN BE OBTAINED AFTER SIGNAL IS RECOVERED WITH DISPERSION COMPENSATION AT RECEIVER.SUCH A CARRIER IS CALLED THE CHIRPED NRZ (CNRZ) SIGNAL PULSE. THIS THESIS NUMERICALLY STUDIES T -HE APPLICATION OF CNRZ SIGNAL PULSE ON WAVELENGTH-DIVISION-MULTIPLEXING OPTICAL COMMUNIC -ATION SYSTEM. NRZ SIGNAL WITH COSINE PHASE MODULATION IS USED.TWO PHASE MODULATION FREQUE -NCIES ARE CONSIDERED.ONE IS THE SAME AS SIGNAL BIT RATE AND THE OTHER IS HALF THE SIGNAL BIT RATE. RESULTS SHOW THAT THE BIT ERROR RATE OF THE CASE WITH PHASE MODULATION FREQUENCY THE SAME AS SIGNAL BIT RATE IS SLIGHTLY BETTER THE CASE WITH HALF SIGNAL BIT RATE.HOWEVER ,MORE IMPORTANTLY, THE RECOVERED SIGNAL AT RECEIVER BECOMES RZ SIGNAL FORMAT WITH PROPER DISPERSION COMPENSATION FOR THE CASE WITH PHASE MODULATION FREQUENCY THE SAME AS SIGNAL BI -T RATE. THE CASE WITH HALF SIGNAL.BIT RATE DOES NOT HAVE THIS PROPERTY.LINE CODING IS REQ -UIRED WITH NRZ SIGNAL FORMAT SO THAT SIGNAL CLOCK CAN BE RECOVERED AT RECEIVER.THE DRAWBA -CK OF LINE CODING IS SACRIFICING EFFECTIVE SIGNAL BIT RATE.THE PHENOMENA OF CONVERTING NR -Z FORMAT INTO RZ FORMAT STANDS FOR LINE CODING IS NOT REQUIRED AND SIGNAL BIT RATE CAN BE FULLY UTILIZED.THEREFORE SYSTEM DESIGN PREFER THE CASE WITH PHASE MODULATION FREQUENCY THE SAME AS SIGNAL BIT RATE TO THE CASE WITH PHASE MODULATION FREQUENCY THE SAME AS HALF SIGNA -L BIT RATE.

Keywords : CNRZ

Table of Contents

第一章 緒 論--P1 第二章 理論模型與背景--P4 2-1光纖傳輸波動方程式--P4 2-2光纖色散--P6 2-3光纖非線性效應--P7 2-3-1自相位調變--P8 2-3-2交互相位調變--P9 2-3-3四波混合--P10 2-4 CNRZ信號產生方法--P11 第三章 傳輸系統架構--P13 3-1系統參數--P13 3-2 信號傳輸品質評估--P14 第四章 CNRZ信號脈衝傳輸特性--P16 第五章 CNRZ信號傳輸品質--P19 第六章 結論--P21 參考文獻--P23 圖表--P27

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