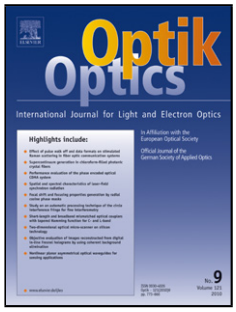

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An Approach for Realistic Estimation of BER due to Signal-Component Crosstalk in a WDM Receiver

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ABSTRACT

In this paper, an approach is proposed to estimate the Bit Error Rate (BER) in a Wavelength Division Multiplexing (WDM) receiver with component crosstalk considering all possible bit combinations in the interfering channels instead of the usual worst-case approach. In addition, probability density function (pdf) and bit error rate (BER) with finite interferers are studied using a new mathematical formulation based on Maclaurin series expansion of the *N*-th power of zero order Bessel Function. This analysis results in more realistic estimation of BER and optimum detection threshold for minimum BER than that obtained using worst-case study. The improvement in accuracy of estimation of BER with the present approach over the worst-case approximation approach is more for higher crosstalk level and large number of interfering channels.

Index Terms- Wavelength division multiplexing, Component Crosstalk, optical network, Signal-Crosstalk beat noise, detection threshold, and bit error rate.

I. INTRODUCTION

Wavelength Division Multiplexing (WDM) which increases spectral efficiency of the fiber-optic transport system, has major impact on the evolution of high transmission network [1,