



SCHOOL OF ENGINEERING

SIMULATION OF POLARIZATION DEPENDENT LOSS IN FIBER OPTICS COMMUNICATION LINK

FINAL REPORT

STUDENT'S NAME : JAGAN GOVINDRAJ

STUDENT'S ID : 99208107

**MAJOR : B. ENG. (HONS) COMMUNICATIONS
& ELECTRONICS ENGINEERING**

FIRST SUPERVISOR : MR. FAWWAZ ABU KHADRA

SECOND SUPERVISOR : MR. EYAD MOH'D MOH'D RADWAN

PROJECT'S COORDINATOR : DR. KHEDR M . M. ABOHASSAN

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Library Services
UCSI Education Sdn. Bhd. (185479-09)
No. 1, Jalan Menara Gading, UCSI Heights,
56000 Kuala Lumpur, Malaysia.
Tel: 603-9101 8880 Fax: 603-9102 3606
Website : www.ucsi.edu.my

Abstract

Polarization Dependent Loss (PDL) refers to the maximum and minimum change in the power transmitted by an optical component or device throughout optical links as the input state of polarization (SOP) is varied over all possible polarization States. Polarization Mode Dispersion (PMD) is a phenomenon where the optical signal split into two orthogonal polarization modes with different propagation velocity, resulting in a different propagation time in each mode, called the differential group delay (DGD).

PMD and PDL combined are a major source of pulse distortion and spreading, and cause power fluctuations in a link that can increase the system bit error rate (BER). Therefore, the PDL and PMD of components must characterize accurately in order to assess the potential impact on the performance of next generation high-speed Dense Wavelength Division Multiplexing (DWDM) systems.

Mathematical procedure Muller-Stokes formalism with aid of current technology devices aimed to composed Polarization Dependent Loss (PDL) by analyzing the State of Polarization (SOP) has been implemented. It's objective of this thesis to explore the nature of mathematical compensation method. Analytically, exact solution presented for polarized light signal which consist of birefringence. Numerically generated results presented for parallel and perpendicularly polarized signal as maximum and minimum transmitted power.

The solution from the mathematical procedure shows the existence of two orthogonally polarized light signals gives peak to peak power variation at the present of birefringence. The formula for variation of incident and transmittance angle at the present of two orthogonally polarized lights is PDL.