Abstract

A fundamental property of optical signal is polarization. Polarization refers to the electric field orientation of the light signal, which can vary significantly along the length of the fiber.

Signal energy at a given wavelength occupies two orthogonal polarization modes. A varying birefringence along its length will cause each polarization mode to travel at significantly different velocity and polarization orientation is related with distance. The resulting difference in propagation time, DGD between two orthogonal polarizations will result in pulse splitting. PMD
is related to the differential group delay, DGD caused by birefringence in optical fibers. Polarization mode dispersion, PMD is a phenomenon found in optical fiber and other wave guides. It is created by fiber irregularities and thus causes dispersion and distortion of the light pulse, thus increasing BER and limiting data rate. There are various types of irregularities in fiber, which arise due to an asymmetric fiber core or can be introduced through internal stresses during fiber manufacture, or through external stresses during cabling and installation. Optical fiber manufacturing processes are designed to yield fibers with a circular cross-section. Any deviation from this form will generally result in an elliptical core, which in turn will result in a refractive index difference between the X and Y-axes of the elliptical core. Even if the fiber core is manufactured with an ideal circular cross-section its refractive index can be asymmetric across its cross-section due to stresses built into the fiber during the manufacturing process or stress that is externally applied during deployment or operation.

In the present paper, authors have analyzed PMD and DGD performance in the single mode fiber with different fiber irregularities.

Reference


Index Terms

Computer Science Algorithms
**Key words**

<table>
<thead>
<tr>
<th>Optical fiber communication</th>
<th>Differential group delay (DGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PMD)</td>
<td>Polarization mode dispersion</td>
</tr>
<tr>
<td>Rate</td>
<td>BER</td>
</tr>
<tr>
<td></td>
<td>Data</td>
</tr>
</tbody>
</table>