A Simple Method for Study of Radial Variation of Pump and Signal Intensities in Mono-Mode Erbium-Doped Graded Index Fiber Amplifier in the Low V Region

Abstract

An optically pumped doped fiber amplifier has emerged as an important device in all optical technology. It provides broad band amplification in case of multi-channel optical signals. Fibers belonging to low V number are important from the point of view of evanescent field coupling. Accordingly, for study of such fibers in all optical technology, one needs to investigate the response of doped fiber amplifier in the low V region. Therefore, knowledge of fundamental
modal field in doped single-mode fiber of low V number is essential to extend the study in the field of variation of modal intensity with radial distance from the axis of the fiber. This study is extremely important in the context of processing information. Using the simple but accurate power series expression for fundamental mode of graded index fiber in the low V region, we predict how the modal intensity varies with radial distance in case of both signal and pump. Choosing some typical step and parabolic index fibers of low V number, we show that our estimations agree with the exact results. Our formalism involves prescription of analytical formulation of the concerned parameters and the execution involves little computation. Thus the present method will be extremely user friendly with the system users.

References


**Index Terms**

Computer Science

Power Electronics

**Keywords**

Single-mode Graded Index Fiber  Erbium-doped Fiber Amplifier  Fundamental Modal Intensity

Chebyshev

Technique

Low V Region
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