RECENT ADVANCES OF DISTRIBUTED OPTICAL FIBER RAMAN AMPLIFIERS IN ULTRA WIDE WAVELENGTH DIVISION MULTIPLEXING TELECOMMUNICATION NETWORKS

Abd El–Naser A. Mohamed[1], Ahmed Nabih Zaki Rashed[2*], Mahmoud M. A. Eid[3]

[1,2,3]Electronics and Electrical Communication Engineering Department
Faculty of Electronic Engineering, Menouf 32951, Menoufia University, EGYPT
[3*]E-mail: ahmed_733@yahoo.com

ABSTRACT

Recently, many research works have been focused on the fiber optic devices for optical communication systems. One of the main interests is on the optical amplifiers to boost a weak signal in the communication systems. In order to overcome the limitations imposed by electrical regeneration, a means of optical amplification was sought. The competing technology emerged: the first was Raman amplification. One reason was that the optical pump powers required for Raman amplification were significantly higher than that for Erbium doped fiber amplifier (EDFA), and the pump laser technology could not reliably deliver the required powers. However, with the improvement of pump laser technology Raman amplification is now an important means of expanding span transmission reach and capacity. We have deeply studied an analytical model for optical distributed Raman amplifiers (DRAs) in the transmission signal power and pump power within Raman amplification technique in co-pumped, counter-pumped, and bi-directional pumping direction configurations through different types of fiber cable media. The validity of this model was confirmed by using experimental data and numerical simulations.

KEY WORDS: Distributed Raman amplifier, Fiber link media, Signal power, Pump power, and Raman gain efficiency.