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42. Gain Management Scheme for EDFA in Optical Communication Systems

Abstract

Network management is an important part of any network. Being vital part, network management plays a significant function in optical communication to maintain high speed and efficient communication of information. An efficient and simple management scheme by using SNMP based on MIB for gain control of Erbium Doped Fiber Amplifier can be implemented to triumph over high saturation current and uneven gain distribution on surviving channels due to add/drop of channels in Optical Communication Systems.

Erbium-Doped Fiber Amplifier (EDFA) forms the backbone of high capacity optical communication systems and incredible expansion has been made in the development of broadband erbium-doped fiber amplifiers (EDFAs). This amplifier provides high output power and low noise figure to support the ever-increasing capacity demand on light wave systems. Commercial systems with up to 80 wavelength division multiplexing (WDM) channels having a total capacity of up to 400 Gb/s are currently available. The recently discovered phenomenon of fast power transients in chains of EDFAs constituting an optical network has been shown to impair the performance of propagating channels in the event of channel failure or network reconfiguration. So, with such large traffic volumes at risk, network management is fundamental to the running of such networks.

The Simple Network Management Protocol was designed to be an easily implemented, basic network management tool that could be used to meet short-term network management need. Because of the slow progress in OSI systems management, SNMP has filled the gap and become the dominant standardized network management scheme in use today.

Feasibility and the performance of a simple and efficient management scheme has been analyzed for gain control of EDFA by using standardized network management protocol (Simple Network Management Protocol) and operating the optical amplifier in a link-control scheme to triumph over high saturation current and uneven gain distribution on surviving channels due to add/drop of channels in Optical Communication Systems. Proposed scheme has been demonstrated by using SNMP Simulator (Bytesphere OidView™ and AdventNet™) and optical simulation software package Optsim™ from RSoft.