

Abstract

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Erbium Doped Fiber Amplifier in WDM Systems Using Different Glass Hosts

Multichannel erbium-doped fiber amplifiers (EDFAs) are analyzed based on the rate equations with an analytical approximation model. Forward pumping is considered taking both amplified spontaneous emissions (ASE) scattering loss into account. The output signal power is calculated for ten multiplexed channels along the fiber. The optimum amplifier length which corresponds to the maximum output signal power is then studied showing how it is affected by pump power and input signal power. Finally, the amplifier gain at the optimum length is calculated for each channel. This procedure is repeated for eight different glass hosts, namely almino-germanosilicate, bismuth, LiNbO₃, tellurite, sodium niobium phosphate, oxyfluoride silicate, Al₂O₃ and fluoride phosphate gasses.