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Amplification and switching functions of SOA: impact of amplified spontaneous emission noise

ENGY K. EL NAYAL[a], HEBA A. FAYED[b], AHMED ABD EL-AZIZ[b], MOUSTAFA H. ALY[b,#,*]
[a]*Electrical Engineering Department, Faculty of Engineering, Pharos University, Alexandria, Egypt*
[b]*Photonic Research Lab (PRL) Electronics and Communications Engineering Department, College of Engineering and Technology, Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt,*
[#] *Member of OSA*

This paper proposes the segmentation model of the travelling wave-semiconductor optical amplifier (TW-SOA) or simply (SOA) including the impact of the amplified spontaneous emission (ASE) noise, which is the most important key characteristics that has a clear impact on its performance. The model is used to analyze the direct effects of the input parameters (input pulse power, bias current and input signal wavelength) on the signal gain. These important parameters used to characterize the SOA are represented in case of launching a single Gaussian pulse and also a packet of pulses. This investigation introduces the optimized conditions required for the SOA to maximize its gain for amplification and also to optimize its nonlinear characteristics when used in optical switching.

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