

Noise Suppression of Optical Amplifiers

Overview

In optical communication system, intensity noise is harmful to optical signal transmission and processing. For an instance, in wavelength-division-multiplexing (WDM) systems or passive optical network (PON), spectrum. In optical communication system, intensity noise is harmful to optical signal transmission and processing. For an instance, in wavelength-division-multiplexing (WDM) systems or passive optical network (PON), spectrum slicing is an attractive way as they use the cost-effective available incoherent optical source, such as the light-emitting diodes, super-luminescent diodes, and fiber-based amplified spontaneous emission (ASE) sources. By spectrum slicing, only one broadband optical source is needed to form many channels by dividing the spectral slice to each channel. However, the optical signal-noise ratio (OSNR) suffers from the severe intensity noise of the broadband optical source. Another typical example is the super-mod. The enhanced performance for relative intensity noise (RIN) reduction based on reflective semiconductor optical amplifiers (R-SOA) has been investigated theoretically by comparison with conventional transmission SOA. The results show that, by selecting appropriate input optical power, as large as >20 dB RIN suppression

improvement can be achieved for R-SOA, without sacrificing the noise rejection bandwidth. With increased injection current, the optimized input signal power is decreased and the operation region is extended for the best RIN reduction. For RIN suppression in WDM spectrum slicing, the bandwidth optimization of receiver filter should be performed to avoid the spectral broadening induced by self-phase modulation (SPM) and four wave mixing (FWM). Our derive. Reflective semiconductor optical amplifiers (R-SOA)Relative intensity noise (RIN) suppressionThe schematic diagram of RIN suppression based on R-SOA is shown in Fig. 1. The signal light with noise is launched into R-SOA via an optical circulator (OC). The tunable optical band-pass filter (BPF) is applied to exclude the ASE of R-SOA. The signal input power into R-SOA can be adjusted using a variable optical attenuator (VOA) to reach the opt. The device structure and material parameters used in simulation are listed in Table 1. In the following discussions, RIN suppression comparisons between convention transmission SOA and R-SOA will be discussed in detail. The parameters' optimization for the best RIN reduction is also shown. Table 1. Device structure and material parameters used in calculations. Fig.2 shows the comparisons on MTF ((a) and (b)), carrier density distribution ((c) and (d)), and optical power distribution ((e) and (f)) between R-SOA((a), (c) and (e)) and conventional transmission SOA ((b), (d) and (f)) for various signal input powers. In Fig. 2(e), the solid and dotted lines represent the forward and backward optic.

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	<p>In this letter, we propose an all-optical fiber amplifier system for highly efficient and broadband intensity noise suppression of given input pulse trains.</p>
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	<p>The enhanced performance for relative intensity noise (RIN) reduction based on reflective semiconductor optical amplifiers (R-SOA) has been investigated theoretically by comparison with ...</p>
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	<p>Abstract: Suppression of Brillouin amplifier intensity noise is demonstrated by use of a semiconductor optical amplifier (SOA) at its output to enhance application of its narrowband gain for ...</p>
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	<p>We present the suppression of intensity noise using a gain-saturated semiconductor optical amplifier (SOA). A noise reduction of 10 dB was obtained in a single stage SOA, which can be enhanced by ...</p>
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	<p>In this paper, we present an experimental and numerical study of semiconductor optical amplifier (SOA)-based noise suppression and its relevance to high-channel-density spectrum-sliced...</p>
	<p>Preliminary investigations into incorporating a saturated SOA to reduce low frequency noise of a highly coherent fibre distributed feedback laser are also presented.</p>
	<p>We present a quantitative estimation of noise reduction in a gain-saturated semiconductor optical amplifier (SOA) for spectrum-sliced incoherent light sources. A noise reduction of 10 dB over ...</p>
	<p>Two cascaded semiconductor optical amplifiers are used to suppress the intensity noise of a spectrum-sliced incoherent channel with a bit rate as high as 10 Gbit/s for 2.6 nm channel bandwidth.</p>
	<p>Abstract— Theoretical and experimental results on the reduction of the intensity noise in spectrum-sliced wavelength-division-multiplexing systems using a saturated semiconductor optical amplifier ...</p>

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For more information, pricing, or custom solutions, please contact us:

Website: <https://samastersbaseball.co.za>

Email: sales@samastersbaseball.co.za

Phone: +27 63 874 2095

Address: 15 Innovation Drive, Technopark, Stellenbosch, 7600, South Africa

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