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Investigation of High Gain Dual-pump Phase Sensitive Amplifiers

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Abstract:

In this paper, we investigated a high gain dual-pump degenerate phase sensitive amplifiers. We achieved a 22-dB signal gain with a nonlinear phase shift of 2 rad in the 3-nm pump-wavelength separation scheme. Here, we optimized the fiber dispersion to weaken the de-amplification effect of high-order sidebands based on a 27-wave numerical model. By using such a narrow-wavelength-separation dual-pump phase sensitive amplifier scheme, we achieved a 3.3-dB optical signal-noise-ratio improvement compared with that of erbium doped fiber amplifier with the same gain.

Keywords: Phase sensitive amplifiers, Four wave mixing, Fiber dispersion.

1. Introduction

Phase-shift keying (PSK) signals are extensively applied in the commercial optical communication systems owing to their high spectral efficiency. However, amplified spontaneous emission (ASE) noise from optical amplifiers will unavoidably distort the signals. Therefore, it is vital to investigate phase sensitive amplifiers (PSAs) to enable low-noise amplification of PSK signals and enhance the OSNR for preventing

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