Amplitude regeneration of RZ-DPSK signals in single-pump fiber-optic parametric amplifiers

The input power tolerance of a single-pump fiber-optic parametric amplifier (FOPA) is experimentally shown to be enhanced for return-to-zero differential phase-shift keying (RZ-DPSK) modulation compared to RZ ON-OFF keying modulation at 40 Gb/s. The improved nonlinear tolerance is exploited to demonstrate amplitude regeneration of a distorted RZ-DPSK signal in a gain-saturated FOPA. An optical signal-to-noise ratio penalty of 3.5 dB after amplitude distortion is shown to be reduced to 0.2 dB after the FOPA, thus clearly demonstrating the regenerative nature of saturated FOPAs for RZ-DPSK modulation.

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