

## **Recent four-wave mixing suppression methods**

### **Abstract**

This paper reviews various techniques that have been proposed by many researchers to reduce the effect of four-wave mixing (FWM). A review was suggested to investigate the recent method of each technique and to compare their benefits and limitations in a wavelength division multiplexing (WDM) system. A FWM is defined as an undesirable nonlinear effect that gives significantly degraded system performance, and is expected to become the major drawback for optical communication systems. Among all the suppression techniques, there are six categories that are reviewed in this paper to suppress the effect of FWM and improve the overall system performance, which are: analysis of the individual and combined effects of high dispersion on FWM; using a hybrid WDM and time division multiplexing technique; using optic code division multiple access, using a short fiber optical parametric amplifier; using ultra-low unequal channel spacing, and finally, using a return-to-zero frequency shift-keying modulation format. The reduction techniques of FWM effect were compared according to the benefits and weaknesses of each technique in the application of WDM communication systems.

### **Keywords**

Fiber nonlinear effects; Four-wave mixing; Modulation format; Optical networks; Wavelength division multiplexing