Optical domain service differentiation using spectral-amplitude-coding

ABSTRACT

We have implemented a new service differentiation technique in the optical domain using a spectral-amplitude-coding (SAC) variant of optical code division multiple access (OCDMA). The newly developed code, named KS (Khazani–Syed) is compared mathematically with other codes which use similar techniques. In our proposal, multiple weights are used to support 'triple-play' services (audio, video and data) with different quality-of-service (QoS) requirements. The results characterizing the bit-error-rate (BER) with respect to the total number of active users show that KS offers a significantly improved performance over the previous reported techniques by accommodating additional 30 users with shorter code length and smaller code weight at BER of 10^{-9}. In variable weight system, we have shown that KS codes with larger weight always have the best performance when other users of different weights are present in the system.

Keyword: Optical CDMA; Spectral-amplitude-coding; Variable weight system