

Configuration design and performance analysis of a fast frequency modulation optical CDMA communication system

ABSTRACT

A fast frequency modulation optical code division multiple access (CDMA) communication system is proposed. In this system, an electrically controlled tunable optical filter (TOF) is used to encode the modulated broadband light source. The code depends on the function set to the controller. Two-dimensional functional code is also proposed based of shifted sine function. The function defines the dynamic coding pattern of the central wavelength of the transmitted narrowband optical signal. The system allows for an easy reconfiguration of the transmitter without the need for sophisticated encoder. At the receiver, a synchronized TOF with the same function is used as a decoder. The performance of this system is shown to be better compared with a fast frequency hopping and a spectral amplitude coding systems.

Keyword: Multiple access interference; Optical code division multiple access (CDMA); Optical fiber communication