

Realization of wavelength-time modified double weight codes optical code division multiple access system

Abstract

Explosive growth of bandwidth demand together with advance in latest communication services and emerging applications have inspired interest in optical code division multiple access (OCDMA). The work focuses on analysis and demonstration of two-dimensional (2-D) modified double weight (MDW) OCDMA wavelength-time. The 2-D MDW uses balance-detection for mitigating multiple access interference. The property of cross-correlation results in optimum phase induces intensity noise suppression (PIIN). The proposed code achieves high scalability; below 10^{-9} BER error floor the code cardinality reaches 254 simultaneous numbers of users which is double the 2-D PDC performance. The lowest effective power (P_{sr}) for minimum optical transmission requirement for smallest number of users is achieved at-17.5dBm. The 2-D MDW OCDMA simulation model is developed to validate the realization of the code for BER and distance performance. The 2-D MDW OCDMA code successfully suppresses PIIN and mitigating MAI which result in high cardinality, reduce P_{sr} and improved distance.

Keywords; Modified Double Weight, Multi-Access Interference, Optical Code Division Multiple Access, Phase Induce Intensity Noise (PIIN)