Abstract

With the hailing winds of development, humans are still can’t fully act individually, the dependency over the nature is indispensable. In this paper, a hybrid nature inspired based algorithm named Cuckoo search algorithm with mutation (CSAM) has been used to solve the channel–allocation problem presents in optical wavelength division multiplexing (WDM) systems. The channels can be allocated by using the concept of shortest length rulers called optimal Golomb ruler (OGR) sequences to suppress four-wave mixing (FWM) crosstalk. The simulation results reveals that computational time taken by CSAM to generate channel–allocation algorithm has been abated substantially unlike other existing nature inspired based algorithms such as Genetic algorithms (GAs), Biographically based optimization (BBO), and Cuckoo search algorithm (CSA). The simulation results obtained by proposed hybrid algorithm demonstrates better and efficient in terms of length of the ruler, total channel bandwidth, and bandwidth expansion factor compared to simple classical approaches such as Extended quadratic congruence (EQC) and Search algorithm (SA) and other nature inspired based algorithms.
15. Distributed.net, “Project OGR”. Available at http://www.distributed.net/ogr.
17. http://mathworld.wolfram.com/PerfectRuler.html


Index Terms
Computer Science
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Keywords

Bandwidth expansion factor, Channel-allocation, Cuckoo search algorithm with mutation, Four-wave mixing, Optimal Golomb ruler, Wavelength division multiplexing.