Abstract

Nature is a good source of inspirations for us. The algorithms developed from the nature are most powerful algorithms for optimizing many complex engineering design problems having multiple objectives (multi–objective). This paper presents an hybrid algorithm based on Multi–objective Big bang–Big Crunch (MOBB–BC) nature–inspired optimization algorithm with Genetic crossover and Differential evolution (DE) mutation operators for solving the minimum length ruler called Optimal Golomb ruler (OGR) as channel–allocation problem to reduce four–wave mixing crosstalk (FWM) effects in optical wavelength division multiplexing (WDM) systems. The comparative study of simulation results obtained by proposed hybrid Multi–objective BB–BC (HMOBB–BC) algorithm demonstrates better and efficient generation of OGRs in a reasonable computational time compared to simple BB–BC algorithm and one of the existing nature–inspired algorithms i.e. Genetic algorithm (GA). Also, the proposed hybrid algorithm outperforms the two existing conventional algorithms i.e. Extended quadratic congruence (EQC) and Search algorithm (SA), in terms of ruler length and total channel bandwidth.
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Index Terms

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Keywords

Channel spacing, Genetic algorithm, Hybrid Multi–objective Big bang–Big Crunch optimization algorithm, Optimal Golomb ruler.