

Improved Multi-Objective Firefly Algorithms to Find Optimal Golomb Ruler Sequences for Optimal Golomb Ruler Channel Allocation

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Abstract : Recently nature-inspired algorithms have widespread use throughout the tough and time consuming multi-objective scientific and engineering design optimization problems. In this paper, we present extended forms of firefly algorithm to find optimal Golomb ruler (OGR) sequences. The OGRs have their one of the major application as unequally spaced channel-allocation algorithm in optical wavelength division multiplexing (WDM) systems in order to minimize the adverse four-wave mixing (FWM) crosstalk effect. The simulation results conclude that the proposed optimization algorithm has superior performance compared to the existing conventional computing and nature-inspired optimization algorithms to find OGRs in terms of ruler length, total optical channel bandwidth and computation time.

Keywords : channel allocation, conventional computing, four-wave mixing, nature-inspired algorithm, optimal Golomb ruler, lévy flight distribution, optimization, improved multi-objective firefly algorithms, Pareto optimal

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