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Assignment of cells to switches in cellular mobile network: a learning automata-based memetic algorithm

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Abstract

Handoff and cabling costs management plays an important role in the design of cellular mobile networks. Efficient assigning of cells to switches can have a significant impact on handoff and cabling cost. Assignment of cells to switches problem (ACTSP) in cellular mobile network is NP-hard problem and consequently cannot be solved by exact methods. In this paper a new memetic algorithm which is obtained from the combination of learning automata (LA) and local search is proposed for solving the ACTSP in which the learning automata keeps the history of the local search process and manages the problem's constraints. The proposed algorithm represents chromosome as object migration automata (OMAs), whose states represent the history of the local search process. Each state in an OMA has two attributes: the value of the gene (allele), and the degree of association with those values. The local search changes the degree of association between genes and their values. To show the superiority of the proposed algorithm several computer experiments have been

conducted. The obtained results confirm the efficiency of proposed algorithm in comparison with the existing algorithms such as genetic algorithm, memetic algorithm, and a hybrid Hopfield network-genetic algorithm.

Keywords

Cellular mobile networks Assignment of cell to switch problem (ACTSP) Learning Automata (LA) Genetic Algorithm (GA) Memetic Algorithm (MA) Object Migration Automata (OMA)

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