**عنوان مقاله:**

Modelling and Optimization of Channel Allocation for Power Line Communications Access Networks in the Presence of In-Line and In-Space Interference

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**خلاصه مقاله:**

Background and Objectives: Broadband power line communications (PLC) is a promising candidate for implementing access network of different telecommunication Technologies. Planning process of the PLC access network is subdivided into two main optimization problems of the generalized base station placement and PLC channel allocation. Methods: This paper studies the latter one for an actual PLC network by taking both in-line and in-space neighboring schemes into account for the first time and modeling the PLC channel allocation according to them. In this regards, different aspects of this problem are first introduced in details and then our suggested models for them are presented and numerically evaluated. Results: Specifically, for each pair of the broadband-PLC cells, in-line neighboring is modeled either by one or zero indicating the cells are neighbor or not; in-space neighboring is suggested to be a number from the interval [0 1] according to physical vicinity of cell's wirings; and consequently aggregate neighboring intensity will be a number from [0 2]. Subsequently, the network interference is defined as a function of neighboring intensity and assigned frequency sets to the neighbor cells; so that the more neighboring intensity is increased and the more distance between the sets is decreased, the more interference is imposed on the PLC network. Eventually, the meta-heuristic methods of Genetic and shuffled frog-leaping algorithms are exploited to solve resulting PLC channel allocation problem via minimizing the interference. Conclusion: In general, the results confirmed the success of the suggested method in modeling PLC channel allocation problem in actual scenarios, tracking the network interference in these situations, providing an optimal solution for them, and including all previous research as a comprehensive method.

**کلمات کلیدی:**

Broadband power line communications (B-PLC) access network, PLC channel allocation (PLC-CA) problem, In-line and in-space neighboring schemes, Co-site interference, Genetic and Shuffled frog-leaping algorithms

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