

An evolutionary algorithm for channel assignment problem in wireless mobile networks

Abstract

The channel assignment problem in wireless mobile network is the assignment of appropriate frequency spectrum to incoming calls while maintaining a satisfactory level of electromagnetic compatibility (EMC) constraints. An effective channel assignment strategy is important due to the limited capacity of frequency spectrum in wireless mobile network. Most of the existing channel assignment strategies are based on deterministic methods. In this paper, an adaptive genetic algorithm (GA) based channel assignment strategy is introduced for resource management and to reduce the effect of EMC interferences. The most significant advantage of the proposed optimization method is its capability to handle both the reassignment of channels for existing calls as well as the allocation of channel to a new incoming call in an adaptive process to maximize the utility of the limited resources. It is capable to adapt the population size to the number of eligible channels for a particular cell upon new call arrivals to achieve reasonable convergence speed. The MATLAB simulation on a 49 - cells network model for both uniform and non-uniform call traffic distributions showed that the proposed channel optimization method can always achieve a lower average new incoming call blocking probability compared to the deterministic based channel assignment strategy.