

Impact of genetic operators on energy-efficient wireless sensor network

ABSTRACT

The metaheuristic genetic algorithm is an evolutionary algorithm which means that it will always evolve to get an optimum solution. Due to this intrinsic characteristic, the conventional genetic algorithm might be trapped at local optimum when dealing with a global optimization problem that consists of several maximum points. As such, this paper aims to explore the potential of improving the genetic algorithm by manipulating its operators. With different procedures in selection and replacement operators, the genetic algorithm is able to compute more efficiently. This mechanism is introduced to prevent the proposed algorithm to be trapped at the local optimum point with shorter computation time. The robustness of the proposed algorithm is tested in optimizing a wireless sensor network (WSN) because the WSN will exhibit multiple peaks with different network configuration. The existence of multiple peaks will lead to additional difficulties for the conventional routing protocol algorithm in tracking the global optimum network configuration or known as global optima. The simulation results show the effect of proposed genetic algorithm with different combinations of operators.