Comparative Study of Adaptive Elitism and Mutation Operators in Flower Pollination Algorithm for Combinatorial Testing Problem

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The performance of meta-heuristic search algorithms highly depends on their intensification and diversification abilities. Different algorithms adopt intensification and diversification strategies in order to obtain better results. Elitism and mutation are common operators that are used for increasing the diversity of the population. Flower Pollination Algorithm (FPA) is one of the recent meta-heuristic algorithms for global optimization. Although proven to be efficient, FPA is prone to get stuck into a local optimum due to the weakness of its population's diversity especially for multimodal optimization problem. In this paper, first, we propose two strategies based on mutation-FPA (mFPA) and elitism-FPA (eFPA) for t-way test generation (t refer to interaction strength). Then, a comparison between mFPA and eFPA is studied to analysis the effect of introducing elitism and mutation operators on FPA's performance. The results of the experiments show that both of eFPA and mFPA strategies appear to produce better results than original FPA strategy, however, eFPA performs much better than mFPA in term of tests size.

Keywords: Meta-heuristic algorithms, Flower Pollination Algorithm, T-way testing Elitism Operator, Mutation Operator.