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An experimental study of hyper-heuristic selection and acceptance mechanism for combinatorial *t*-way test suite generation

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ABSTRACT

Recently, many meta-heuristic algorithms have been proposed to serve as the basis of a *t*-way test generation strategy (where *t* indicates the interaction strength) including Genetic Algorithms (GA), Ant Colony Optimization (ACO), Simulated Annealing (SA), Cuckoo Search (CS), Particle Swarm Optimization (PSO), and Harmony Search (HS). Although useful, meta-heuristic algorithms that make up these strategies often require specific domain knowledge in order to allow effective tuning before good quality solutions can be obtained. Hyper-heuristics provide an alternative methodology to meta-heuristics which permit adaptive selection and/or generation of meta-heuristics automatically during the search process. This paper describes our experience with four hyper-heuristic selection and acceptance mechanisms namely Exponential Monte Carlo with counter (EMCQ), Choice Function (CF), Improvement Selection Rules (ISR), and newly developed Fuzzy Inference Selection (FIS), using the *t*-way test generation problem as a case study. Based on the experimental results, we offer insights on why each strategy differs in terms of its performance.