

Fuzzy Simulated Evolution For Power And Performance Optimization Of VLSI Placement

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Summary

In this paper, an algorithm for VLSI standard cell placement for low power and high performance design is presented. This is a hard multiobjective combinatorial optimization problem with no known exact and efficient algorithm that can guarantee finding a solution of specific or desirable quality. Approximation iterative heuristics such as Simulated Evolution (SE) are best suited to perform an intelligent search of the solution space. SE comprises three steps, evaluation, selection and allocation. Due to imprecise nature of design information at the placement stage, the various objectives and constraints are expressed in fuzzy domain. The search is made to evolve towards a vector of fuzzy goals. In this work, a new method to calculate membership in evaluation stage is proposed. Selection stage is also fuzzified and a new controlled fuzzy operator is introduced. The proposed heuristic is compared with Genetic Algorithm (GA) and the proposed fuzzy operator is compared with fuzzy ordered weighted averaging operator (OWA). Fuzzified SE (FSE) with controlled fuzzy operators was able to achieve better solutions.

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