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Fuzzy genetic algorithm for floorplanning
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Abstract

Genetic algorithms (GAs) have been found to be very effective in solving numerous optimization problems, especially those with many (possibly) conflicting and noisy objectives. However, there seems to be no consensus as to what fitness measure to use in such situations, and how to rank individuals in a population on the basis of several conflicting objectives. Fuzzy logic provides an effective and easy way of dealing with such class of problems. In this work, we present a fuzzy genetic algorithm (FGA), which combines the parallel and robust search properties of GA with the expressive power of fuzzy logic. In the proposed FGA, the fitness of individuals is evaluated based on fuzzy logic rules expressed on linguistic variables modeling the desired objective criteria of the problem domain. Several fitness fuzzification approaches are evaluated and compared with Weighted Sum GA (WS-GA), where the fitness is set equal to a weighted sum of the objective criteria. Experimental evaluation was conducted using as a testbed the floorplanning of Very Large Scale Integrated (VLSI) circuits.

Keywords

Fuzzy sets, Optimization, VLSI circuits, Integrated circuit layout, Computational linguistics