**Reviewer #1: Referee's report on the paper and response**

This paper presents several iterative heuristics for the optimization of VLSI netlist bi-partitioning with multiple objectives including power, delay, area and minimum cuts. Fuzzy rules were incorporated in order to handle the multiobjective cost function.
In the past most work on VLSI Physical Design automation (partitioning, placement, routing) concentrated on one objective function and in place neglecting others. The main contribution of this paper (in my opinion) is to solve the multiobjective optimization problem of partitioning using Fuzzy rules.

The paper is well written and the work is considered important for VLSI Circuit Design Automation. However I have several concerns:

1) **Reviewers Comment:** References are a bit old and the authors should cite most current papers found in IEEE TCAD, DAC conference, ICCAD conference, ISPD workshop etc.

   **Our Response:** Current references have been added and discussed in the "Introduction", "Genetic Algorithm (GA) and Tabu Search (TS)" sections.

2) **Reviewers Comment:** No info about the size of the benchmarks. Authors should include a table that summarizes the features of the circuits, number of nets, number of cells, IO pads e.t.c. There are several new circuits used to test VLSI circuit partitioning algorithms IBM test suits by Chuck Alpert (ISPD98 Circuit Benchmarks Suite).

   **Our Response:** The required details for the size of the circuits have been presented in a separate table.

   One of the objectives of this work is the comparison of the performance of the three iterative heuristics for Power, Delay and Cut. Data such as long paths in a circuit, switching probabilities, etc were available only for ISCAS benchmarks; this is the reason why ISPD suite could not be used.

3) **Reviewers Comment:** The paper deals with two way partitioning. How can the work be extended to multiway partitioning? Would the results be the same?

   **Our Response:** The work can be easily extended to multi-way partitioning, the details for which can be found in a reference (Al-Abaji, 2002) provided in Section '2' of the paper.

4) **Reviewers Comment:** The authors spent a considerable amount of time explaining the Simulated Evolution (SimE) approach. However they failed to describe the GA and TS with the same amount of detail. Why?

**Our Response:** All three sections on SimE, GA, and TS have been updated such that each one of them is addressed in sufficient detail. Simulated Evolution has been explained in more detail since one of the main focuses of the work is on engineering Simulated Evolution for multi-objective b-partitioning.

5) **Reviewers Comment:** Some figures might help to describe the Chromosome representation for GA and Crossover and mutation operations.

   **Our Response:** The figures and details can be obtained from the appropriate references provided for GA (Readers are referred to (Sait, 1995) in the article).

6) **Reviewers Comment:** On page 15 the authors mention the parameters used for GA, TS without getting into the details of how they obtained these parameters or at least referring to a previous publication where they have showed more details in fine tuning the parameters.

   **Our Response:** A reference has been included which discusses both the details of the parameters and also their tuning.

7) **Reviewers Comment:** The most important issue that lacks from the paper is the following: The paper main contribution as I have mentioned earlier is introducing Fuzzy rules that attempt to combine several objectives. There should be a table and section within the paper that compares the fuzzy rule approach with a traditional i.e. weighted approach in terms of solution quality obtained and CPU time.

   **Our Response:** A subsection entitled “Fuzzy Logic Approach”, Page 4 (in Section 2: Methods for Solving Multi-Objective Problems) has been added. The section also discusses various other methods adopted to handle the same problem.

**Reviewer #2: Referee's report on the paper and response**

« Evolutionary Algorithms for VLSI Multiobjective Netlist Partitioning »

By S.M. SAIT, A.H. EL-MALEH & R.H. AL-ABAJI

Submitted for publication in « Engineering Applications of Artificial Intelligence »

The paper studies three new algorithms achieved by the authors to solve the VLSI Multiobjective netlist-partitioning problem: a Genetic Algorithm (GA), a Tabu Search (TS) algorithm and a Simulated Evolution (SimE) algorithm. The paper is well written and clear. However, in my opinion, it cannot be accepted as itself and needs a complete revision, taking into account the subsequent issues:

1) **Reviewers Comment:** The first section (Introduction) and the beginning of the second one are O.K. The authors give a complete state of the art on the problem, and a mathematical accurate and rigorous formulation of the VLSI netlist partitioning problem and of the cost functions to be handled: cutsize, delay and power consumption. Then a fuzzy rule is proposed to combine the conflicting objectives. However, it is not clear why the authors adopt such a fuzzy formulation. The authors must develop that issue, and roughly describe the various methods that have been proposed in the literature to handle the same problem. They must justify the fuzzy formulation in relation with the other non-fuzzy approaches described in the literature.

   **Our Response:** A subsection entitled "Fuzzy Logic Approach", page 4 (in Section 2: Methods for Solving Multi-Objective Problems) has been added. The section also discusses various other methods adopted to handle the same problem.

2) **Reviewers Comment:** Sections 3 and 4 of the paper describe with a lot of details the implementation of GA, TS, and SimE that have been performed by the authors. These sections are clearly presented, but they suffer from three drawbacks:

   a. Firstly, it is not necessary to give so many details about the methods developed by the authors. The interested reader can find in the IEEE book published in 1999 by the first co-author all details about the methods themselves;
   b. Secondly, it would be more interesting for a paper to be published in a journal to give more details about the competing methods that have been proposed in the literature for the same problem;

c. Thirdly, some implementation details have to be justified. For instance, the authors state that experimentally we found that a base value of 2 is suitable to quantify that Tmax(i) is much smaller than Tmax. Such assertion is too fuzzy to be really useful for any reader…

**Our Response:**

a. All three sections on SimE, GA, and TS have been updated such that each one of them is addressed in sufficient detail.
b. Section 1, Introduction, has been re-written and some new related work (in 2nd last para) has been added. Some of the very recent methods (proposed in 2002 and 2003 respectively) reported in the literature for the same problem have been included in this section.
c. This was obtained experimentally; we will look into this issue and elaborate.

3) **Reviewers Comment:** Conversely, Section 5 is far too short. The authors discuss only the results that they obtained through the use of their own algorithms, but they propose no comparison against competing algorithms on the same VLSI Multiobjective Netlist Partitioning problem. In consequence, it is unclear if the experimental results bring improvement vs. those obtained through other existing algorithms. That issue is the main problem with the paper under submission.

**Our Response:** One of the objectives of this work is the comparison of the performance of the three iterative heuristics for Power, Delay and Cut. Data such as long paths in a circuit, switching probabilities, etc., were available only for ISCAS benchmarks; this is the reason why work could not be compared with others. Previous published work addresses only one or two of the three issues.

4) **Reviewers Comment:** Table 1 showing a comparison between SimE, GA and TS is hardly readable. It must be completed by at least one curve.

**Our Response:** Table has been updated accordingly and explanation of results has been revised.