ABSTRACT

of attestation master's degree work

subject:

"Research of parallelization methods in problems of physical verification"

By Olena Brytova

Actuality of work

A permanent reduction in the size of technological processes for joint production of integrated circuits entails a complication of design standards. This in turn impose certain restrictions of the means of physical verification. Modern facilities for physical verification must satisfy two conditions - high accuracy and minimal solution time of the problem. If the first condition, most modern products satisfy, solving the problem of physical verification by modern tools of today can take from several days to several weeks, depending on the complexity of the project. x To reduce the time for solving the problem significantly parallelization of the problem of physical verification can be used. Different methods of parallelization exist, each has advantages and disadvantages for different types of problems. Therefore, the investigation of parallelization methods in problems of physical verification features is a very important issue.

The purpose of work

The purpose of this work is to investigate and analyze parallelization techniques in problems of physical verification in terms of their effectiveness in modern technological processes.

Tasks solved in work

1. Investigation of the features of various parallelization techniques in problems of physical verification.

2. Identify the advantages and disadvantages of different types of parallelisation for problems of the physical verification.

3. Investigation of the features and scheduling algorithms of loas distribution for parallelisation problem of physical verification.

4. Analysis of the feasibility of using GRID-technologies for parallelization tasks of physical verification.

5. Investigation of the influence of separation factor design code for parallelization of design rules for different numbers of processors.

6. Investigation of the possibility and impact of prioritizing subtasks in parallelisation by design rules.

The achieved results

Solving the tasks put in-process, an author protects:

1. Results of the analysis parallelization methods in problems of physical verification. Recommendations for the use of different types of parallelization for different types of problems.

2. Load distribution scheduling method in data processing which takes into account the parallelization of tasks of physical verification.

3. Method of resource scheduling in data processing system with a lack of resources, which takes into account the parallelization of tasks of physical verification.

4. The results of the feasibility research on the use of GRID - technologies for solving problems of physical verification.

5. The results of the research of the effect of separation factor of design rules for parallelization of design rules for the efficiency for different numbers of processors.

6. Recommendations for the use of separation factor of design rules for tasks of varying complexity.

7. The results of the research capabilities and effectiveness of prioritizing subtasks for parallelization.

8. Recommendations for prioritizing subtasks

Scientific novelty

The scientific novelty of this paper is to analyze parallelization techniques in terms of physical verification tasks. Described disadvantages and advantages of each method in the point of view of modern technological processes, recommendations on the use of different types of parallelization for different types of modern problems. Propose methods for resource planning, which take into account physical verification tasks specificity.

Practical value

The practical value of the work is to obtain practical advice on the use of different methods of parallelization in problems of physical verification. More deeply and experimentaly investigated a method to parallelize the design standards, developed recommendations for the use of separation factor design standards. The recommendations on the use of GRID - technologies for solving problems of physical verification.

Conclusions

1. Analyzed the main methods of parallelization in problems of physical verification in terms of their effectiveness in modern technological processes. The main advantages and disadvantages of parallelization methods. Found useful for large projects using combined methods for parallelization, especially when the possibility of building a cluster of several stations, multiple processors on each exists. Depending on the input data (the degree of hierarchy in topology) developed recommendations for the use of combined methods.

2. Also features of the parallelization problems of physical verification in terms of planning and scheduling resources (CPU time, virtual memory, disk space). Proposed a method for controlling the distribution of load in the system of data processing and management techniques of resources in data processing systems with insufficient resources. These methods can also be used in other data processing systems.

3. The recommendations on the use of GRID-technologies to address problems of physical verification developed.

4. Experimentally by solving real problems investigated the effect of separation factor design rules (for parallelization of design rules) for the acceleration for different numbers of processors and tasks of varying complexity. The possibility of setting priorities for subtasks by user, which could increase the speed for a particular type of problem in a particular cluster configuration.

The work contains 100 pages, 20 images, 21 sources.

Keywords: physical verification, DRC, LVS, cluster, GRID, design rules, topology, hierarchical structure, the method of Richard Bellman, acceleration, Amdahl's law, dynamic programming, complexity, information processing system, process, priority of subtasks.