Abstract

* 研究fix-outline floorplan方法，和hierarchical design style有關，適用於very large ASIC, SoC。
* fix-outline版難度遠高於classical版
* 於SA，使用new objective functions以及new types of moves
* 可減少soft block連線長度、優化aspect ratio
* 使用slack-based move
* 使用已存在的演算法去以sequence pair表示法去做slack計算，run time和同樣使用sequence pair的論文中最快的差不多[28]
* 若用其他種表示法，run time double
* 實驗使用Parquet-1 benchmark去實作outline-free and fixed-outline module
* 使用top-down, hierarchical paradigm，於在37分鐘完成32000 cells的擺放

Introduction A

* We point out that in the classical floorplanning formulations, movable blocks tend to have fixed aspect ratios, but the overall floorplan is not constrained by an outline.
* While several recent works allow for variable block aspect ratios, the more modern fixed-outline formulation (see Section I-B) has not been addressed.
* In our experiments, area terms dominated wirelength terms unless highly problem-specific coefficients are used. In other words, it is difficult to fully automate a floorplanner that explores nondominated solutions with respect to wirelength and area objectives.
* To summarize, classical floorplan approaches entail difficult multi-objective optimization and often rely on representations that may not capture any minimum wirelength solutions.

Introduction B

* The modern floorplanning formulation was proposed by Kahng [13] and is an “inside-out” version of the classical outline-free floorplanning formulation—the aspect ratio of the floorplan is fixed, but the aspect ratios of the blocks can vary. It has not yet been explicitly addressed in the literature, partly due to the lack of benchmarks.
* Since our work addresses this formulation, we reevaluate the relevance of classical floorplanning results in the new context.
* We conclude that classical floorplanning is largely relevant to the new floorplan formulation proposed by Kahng [13], however, the new formulation must be addressed through ways other than novel representations. This is primarily due to the fact that known floorplan representations and manipulation algorithms do not allow effective traversals of the solution space without violating important constraints, such as the fixed-outline constraint discussed in our work.
* While such representations and algorithms may be proposed in the future, an alternative approach is to allow temporary violations and either tolerate or fix them.

Background

* A fundamental theorem from [20] implies that at least one minimal-area placement is representable with sequence pair (in fact, there are many). Therefore, sequence pair representation is justified for area minimization.