

Fédération d'Électronique

Semi-Automated Analog Placement

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Automation tools dedicated to analog circuits are not as mature as the digital ones but have been improved a lot, at a point that they can help at individual steps in the analog design flow. In this work, we introduce a semi-automatic analog placement approach guided by designers' preferences. This semi-automatic approach also helps designers to debug more efficiently and makes adjustments easier since they will control the overall relative placement of the circuit but at the same time, some tiresome and error-prone tasks are automated.

The Cairo Hurricane AMS (CHAMS) project, developed by the LIP6 Laboratory, proposes a complete flow which would be able to create a library of analog blocks. The layout can be automatically generated and optimized with little intervention from designers. The flow provides a reliable and efficient solution taking into account parasitic effect-aware layout generation with enough flexibility to adapt to different designers needs and concerns. Our layout generation tool supports any technology with the new nanometric layout dependent parasitic parameters.

Digital and analog circuits have a dedicated area on a system-on-chip circuit so they can be independently designed within a specific space. Digital circuits are well-known for their regular row structure where standard cells are placed and routed accordingly to their netlist. It is common to design analog circuits in rows of analog blocks where the height of each row is adjustable so it can match its dedicated area. We experiment our tool on a fully differential transconductor, designed under a technology CMOS 130 nm. The fully differential transconductor is composed of a total of 32 blocks. The placement tool takes into account 11 symmetries for this circuit. It generates 384 different placements and the designer can choose one of them based on his preferences and area constraint.