Pulsic Animate™
Fastest Route to Simulation-Ready Layout for Analog Designs

Analog Design Automation: The Productivity and Quality Gap

As analog designers target process nodes 90nm and below, the complexities of layout have made analog design automation a necessity. Issues such as layout-dependent effects (LDE), electro-migration (EM), voltage drop (IR) and noise coupling have greater impact at smaller nodes. Automation can ensure correct-by-construction layouts, generated in reasonable amount of time.

A typical design flow encompasses area estimation (early floorplanning), simulation-ready layout and final layout. Of these phases, the biggest bottleneck is the time it takes to get simulation-ready layout. There are numerous potential design iterations through schematic – layout – extraction – simulation and passing constraints between circuit designer and layout engineer can be time consuming as well as error-prone. To improve productivity, an automation solution needs to be easy to use and quickly deliver multiple simulation-ready layouts based on constraints so that engineers can make quality trade-off decisions early in the design process.

In order to automatically generate high-quality layouts requires a tool that is built from the ground up to specifically solve analog design needs. Most analog design automation solutions in the market today are digital tools that have been force fitted to the problems of analog design. A major problem with these tools is that placement and routing are performed as separate, serial operations. For optimal analog layout, placement must be performed in the context of the routing, and vice versa, just as experienced analog designers would during manual layout.

Animate Delivers Productivity Gain for Analog Designers

In a traditional design flow, a circuit designer will send schematics and constraints to the layout engineer, who in turn will manually generate the layout that the circuit designer can use to verify the design. This process can take days or weeks and if there are any design changes that require multiple iterations, it can have significant impact on the schedule.

Animate is a fully automated transistor-level layout solution for analog and custom digital designs. It offers circuit designers and layout engineers an easy-to-use, automated layout flow that takes existing schematics and rapidly extracts constraints based on netlist topology analysis. Animate creates multiple, complete, LVS correct hierarchical layouts in minutes.

Animate’s unique capability to create many electrically correct layouts from the input schematic in minutes enables circuit designers to explore multiple layout options in a fraction of the time it takes a layout engineer to produce a single layout by hand. These simulation-ready layouts with better than PCELL parasitics allow circuit designers to accurately simulate multiple iterations of layouts early in the process, further speeding up the entire design cycle.

Animate’s Blueprint views enable engineers to make accurate area estimation early in the design process and explore various floor plan options. It also allows engineers to use alignment constraints to control layout placement order. Animate’s generated simulation-ready layouts provide required layout topology alignment to accelerate ‘Design Finishing’ and increase productivity for layout engineers.

Fig.A- Animate easily handles multiple levels of hierarchy
Animate Layout Automation Produces Quality Results in Less Time

Analog design teams need high-quality results, automatic constraint handling and a flow that understands analog design. Drawing on more than a decade of experience working closely with leading-edge custom design groups, Pulsic has developed an entirely new approach to transistor-level layout.

PolyMorphic Layout, a patent-pending technology employs a novel database and algorithmic architecture to derive many potential layouts, which crystallizes into multiple LVS correct (Zero Opens/Zero Shorts) layouts. These layouts are created so that the interdependent effects of placement and routing are optimized simultaneously to produce high-quality results.

Animate is an easy-to-use tool that does not require arduous setup. Its’ simple graphical user interface guides the user through the flow and enables designers to visualize layout options quickly. Animate reads OpenAccess schematics, either hierarchical or flat, and automatically extracts constraints from circuit topology such as differential pairs, current mirrors and current sources. In addition, these constraints can be quickly edited by the user to customize their layout.

Starting at the lowest-level leaf cells, Animate generates multiple, complete, electrically correct layouts and makes an initial selection of the best ones to use at higher levels in the hierarchy. Designers can choose which layout to actually use and lock the ones that they want to keep. These choices are automatically incorporated into higher levels within minutes.

Designers can use Animate at early design stage with minimal or no constraints to explore possible layout architectures and extract early parasitics for simulation of layout-dependent effects. This approach can provide far more accurate analog block/design size estimation during floorplanning than ever possible previously.

Animate Solves Traditional Analog Design Flow Bottleneck

Animate’s Blueprint views provide fast and accurate area estimation, allowing designers to explore many architectures and assess the impact of various parameters such as number of dummy cells, taps and routing layers, and size of the devices.

As a circuit designer, the ability to automatically generate multiple versions of complete simulation-ready layout early in the design process enables them to verify their design and make quality trade-off decisions without waiting for final layout.

Animate allows layout engineers to accelerate time to final layout by providing alignment constraints to control layout placement order for guided layout, as well as required layout topology to help speed up “Design Finishing.”

With Animate, transistor-level designers gain not only the productivity of automation, but also the ability to explore many design options faster than ever before. Most importantly, this is achieved in a fraction of the time as compared to manual layout implementation.