PANEL: MIXED SIGNAL DESIGNS: ARE THERE SOLUTIONS TODAY?

Chair: Stephan Ohr - Indian Forest Research, Westfield, NJ
Organizers: N. Sisk, R. A. Rutenbar

While it is now possible to obtain real productivity enhancements using EDA tools to synthesize digital logic, the same productivity is hardly available for analog circuit designers. Under the best of circumstances, mixed analog-digital design tools can provide a rough outline for the construction of new devices and circuits. More likely, the user of commercial tools will need to perform a considerable amount of "tuning-and-tweaking" just to get commercial tools to perform properly. Yet, the prospect for tool development remains hopeful. In this combination tutorial and panel discussion, a mixture of university researchers, tool developers and users provide insight into the current state of the art in EDA Tools for Mixed Analog-and-Digital Design.

In the first hour, academic authorities ─ Dr. Rob A. Rutenbar of Carnegie Mellon University in Pittsburgh, and Dr. Georges Gielen of the Katholieke University at Leuven, Belgium ─ offer their brief tutorials on current development efforts. While many of the problems of mixed-signal simulation have been satisfactorily solved, concludes Rob A. Rutenbar, the real utility of mixed-signal design tools will not be realized without the ability to synthesize new cells and circuit blocks from high-level language statements. He reviews current research efforts and makes projections on where and how these efforts are likely to bear fruit.

In the second hour, commercial tool vendors and users offer their insights into the problems of simulation and layout. Designers, they assume, want analog circuitry to follow the same design flow as digital logic. And they want to simulate the behavior of the analog circuitry with the same speed and accuracy as digital logic. The commercial vendors here ─ David Squires of Epic Design Technology, and Ariel Cao of Mentor Graphics Corp. ─ offer their insights into the problems and successes of harnessing digital logic simulators and static timing verifiers to the behavior analog circuits. Where the on-chip devices are MOS transistors, these vendors conclude, a new commercial simulator will come to within 5% or 10% of the ever-popular Spice simulator in terms of accuracy, but with dramatic speedups in simulation speed. But is this good enough--especially when the accuracy of Spice is inevitably off by a few critical percent?

Final comments are offered by some users of mixed-signal tools--Baker Scott of Crystal Semiconductor and Felicia James of Texas Instruments ─ designers whose companies specialize in mixed-signal components. Under pressure to bring new ICs to market, these users' laboratories become the embattled proving grounds for new mixed-signal tool sets. Tool vendors, they feel, have made impressive gains in netlisting and the representation of power supply variables in mixed-signal simulators. But analog circuitry remains a constraint on an otherwise powerful suite of design tools. These veterans have had to write code and build patches to coax a mixed-signal simulator to complete its task. Their discussion will identify the workarounds that may be needed to support the current generation of mixed-signal tools, but they inevitably cast positive light on upcoming generations.

Panel Members:

Ariel Cao - Mentor Graphics Corp., San Jose, CA
Georges Gielen - Katholieke Univ., Leuven, Belgium
Felicia James - Texas Instruments, Dallas, TX
Rob A. Rutenbar - Carnegie Mellon Univ., Pittsburgh, PA
Baker P. Scott - Crystal Semiconductor, Austin, TX
David Squires - EPIC Design Tech., Inc., Sunnyvale, CA