Advances in EDA Tools Focus on Speed, Accuracy and Usability

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Improvements in EDA tools continue to be agressively pursued by commercial and academic researchers and developers. And designers who are increasingly dependent on those tools for fast product development cycles continue to press for more features, faster computations, and more accurate results.

Accuracy

Efforts to improve simulation accuracy emphasize high quality component models and better algorithms for complex calculations such as electromagnetic analysis of irregular or unusual structures.

For example, all vendors provide a steady flow of press releases and user newsletters announcing availability of more component models. AWR recently announced the availability of a Microwave Office™ model library for Mitsubishi Electric's nonlinear GaAs and GaN RF devices. The model library includes high power and low noise HEMT devices, which are commonly used in base station and DBS receivers and other radio equipment.

CST and Agilent both have recently announced the addition of Eigenmode solvers for their EM analysis products, allowing users to analyze and design waveguide, cavity and slow-wave structures. All EM tool developers continue to evaluate mesh geometries to improve accuracy without increasing computation time.

Interoperability

Compatibility with auxiliary tools from different vendors is increasingly in demand by EDA users. Among the designers' needs are interface from circuit design tools to IC fabrication tools.

AWR LFoundry GmbH recently announced the availability of a process design kit (PDK) for LF150, LFoundry's modular 0.15µm RF CMOS process. This new PDK for LF150 targets those customers designing RFICs for telecom, automotive, industrial and energy saving applications. Agilent's EMPro now includes an interface to Cadence Allegro™ that allows PCB designs to be imported for 3D EM analysis.

Nearly all major circuit simulation tool has either an open interface or specific translator capability that allows import/export from third-party EM simulators. This type of user support is required since different EM tools emphasize solutions to different types of problems, e.g. one tool is better for antennas, another for microstrip circuits, and yet another for EMI analysis.

Computation Speed

Agilent's most recent version of its 3D EM tools, EMPro has added FDTD speed improvements, with GPU acceleration support for objects with conformal mesh. The iterative FEM solver now supports CPU multithreading for access to additional computing power.

The need for speed is mainly focused on EM tools, with a variety of recent enhancements released for meshing techniques, multiprocessor support, and adaptive frequency sweep all being applied to address the demand for higher speed, which is needed to solve larger analysis problems. For instance, CST's Microwave Studio now includes high performance computing techniques (HPC) such as GPU acceleration and cluster computing.

Usability

This category includes such things as predefined setups for various wireless standards, better user intefaces, setup wizards, and more built-in analysis and documentation features. Additional training through user groups, webinars, instructional videos and traveling live presentations are commonly available from major (and some minor) software companies.

In the area of features, Agilent recently announced a newt release of its W1716 Digital Pre-Distortion Builder (DPD) software, used to develop amplifiers with the high levels of linearity performance necessary for emerging wideband standards such as LTE-Advanced and IEEE 802.11ac. Their latest EMPro release has 3D modeling GUI enhancements like toolbars, hotkeys, cutplanes and additional user convenience features.

One area of usability is addressed in the article that begins on the following page, which describes the advantages of user-defined equations within EDA tools.

Summary

The universal reliance on software design and simulation means that those tools must constantly be improved to reflect both advances in computing technology and response to new user requirements.