Synopsys Introduces RSoft OptSim Circuit to Automate Design of Next-Generation Photonic Integrated Circuits (PICs)

Expands Capabilities of RSoft OptSim to Accelerate Design of PIC-enabled, High-performance Optical Telecommunications Systems

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Highlights:

- OptSim Circuit is an innovative tool to automate design of next-generation single- and multi-stage photonic integrated circuits (PICs)
- Models bidirectional propagation for both optical and electrical signals
- Models multipath interference (MPI) from network and PIC elements
- Provides a unified platform to evaluate and optimize the impact of PIC performance on the overall system when used with the OptSim tool
- Offers powerful options for design setup, data visualization, plotting and project resource management

Synopsys, Inc. (Nasdaq: SNPS), a global leader providing software, IP and services used to accelerate innovation in chips and electronic systems, today announced the availability of RSoft™ OptSim™ Circuit, an extension of Synopsys' OptSim fiber optic systems modeling tool. With the addition of OptSim Circuit, OptSim's modeling capabilities are expanded to include photonic integrated circuits (PICs); these important optical components enable faster fiber optic networks, accommodate more efficient bandwidths and support network traffic growth. OptSim Circuit can help designers accelerate the design of advanced optical telecommunication systems.

To maximize optical communication network performance, minimize costs and reduce time to market, fiber optics manufacturers need a comprehensive modeling tool that can analyze all aspects of a system, including advanced modulation formats supported by next-generation PICs. Combined, OptSim Circuit and OptSim deliver a single framework, engine and robust sets of models for studying systems ranging from long-haul optical communications systems to sub-micron photonic circuits. For example, users can evaluate system-level performance in OptSim, of a PIC design in OptSim Circuit.

"OptSim Circuit offers an integrated environment for the development of cost-effective, energy-efficient and high-capacity photonic integrated devices and systems," said George Bayz, vice president and general manager of Synopsys' Optical Solutions Group. "OptSim Circuit also provides engineers with innovative new tools and model libraries to enable an intuitive and productive design process."

Key features of OptSim Circuit:

- Models single- and multi-stage bidirectional PICs. To address ever-growing bandwidth demands, the industry is moving toward multi-level modulation and multi-lane digital signal processing. These developments provide an ideal environment for deploying single- and multi-stage PICs comprising a mix of components that are active and passive, electrical and optical.
- Models bidirectional propagation for both optical and electrical signals in PICs. OptSim Circuit makes it possible to model complex signal interactions such as forward and backward propagating reflections and resonance, and it enables the design of PICs that operate with coupling and feedback of different optical and electrical signal paths. This offers a significant advantage over legacy modeling tools based on unidirectional, end-to-end signal propagation, which can fail to capture real-life system behavior that arises due to multiple orders of reflections and resonance between neighboring elements in the chain.
- Models multipath interference (MPI) from network and PIC elements. This capability allows system designers to monitor and correct MPI, which arises due to multiple orders of reflections from connectors and components in a link or on a PIC and adversely affects overall system performance.
- Includes an extensive library of PIC elements such as bidirectional waveguides, bidirectional couplers and connectors, light sources such as lasers and VCSELs, modulators, phase shifters and photodiodes such as PINs and APDs. This modular, system-level modeling framework complements the RSoft products' geometrical-layout-based device tools and addresses system complexity while offering an easy-to-use, block-oriented design method for higher productivity.
- Delivers powerful options for data visualization, plotting and project resource management. OptSim Circuit provides an intuitive representation of repeating and hierarchical system elements, which allows designers to organize and reuse PIC layouts quickly and easily.

"Large, warehouse-scale data centers are driving Ethernet bandwidths to higher speeds—to 100 GbE and even 400 GbE," said Ali Ghiasi, principal of Ghiasi Quantum LLC. "In response, the industry is moving from legacy NRZ signaling to transceiver PICs with significantly higher data rates per lane enabled by advanced modulation techniques such as PAM and DMT. These developments require a comprehensive simulation suite that accurately models optical and electrical impairments, OE/EO devices and MPI. Essential to this suite is Synopsys' OptSim Circuit, which accurately evaluates the impact of MPI-induced penalties in realistic systems with jitter and noise. In addition, OptSim Circuit's ability to model forward- and backward-propagating reflections and resonance is key to modeling single- and multi-stage bidirectional PICs."

Availability & Resources

Synopsys' RSoft OptSim Circuit software is available today. It joins the OptSim and ModeSYS™ products as part of the RSoft System Tools version 2014.09. Customers with a current maintenance agreement can download this version from the Synopsys website using their SolvNet® account.

About Synopsys' RSoft Products

Synopsys' RSoft products are leading solutions in photonic design software and serve several industries including optical communication, optoelectronics and semiconductor manufacturing. RSoft products provide a full range of design, optimization and planning tools for optical communications, as well as solutions for optoelectronics components and subsystems. For more information, visit http://optics.synopsys.com/rsoft.

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) accelerates innovation in the global electronics market. As a leader in electronic design automation (EDA) and semiconductor IP, Synopsys delivers software, IP and services to help engineers address their design, verification, system and manufacturing challenges. Since 1986, engineers around the world have been using Synopsys technology to design and create billions of chips and systems. Learn more at www.synopsys.com.

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