

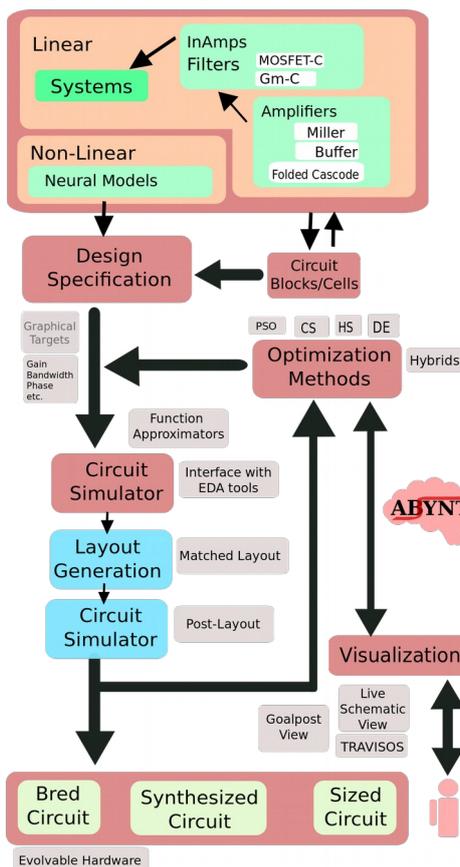
ABSYNTH: Analog Design Automation

An approach to bring VLSI analog design to the hobbyists/non-professionals

Dr.-Ing. Abhaya Chandra Kammara

Automation of analog design process has been pursued for multitude of reasons, for. eg., reduction of time to market, optimizing of the work/knowledge of experts, maintaining the quality of design etc. However, one of the oft overlooked problems is the simplification of the approach so that analog design is also customized and used in fields like IOT where the real benefits of analog design like lower power consumption can lead to incredible applications. VLSI Analog Design has always been inaccessible to non-professionals due to the costs involved unlike PCB level, or digital designs.

ABSYNTH is an analog design automation tool written to interface with FOS tools and has been compared with professional work flows. These have been presented earlier in CEBIT 2014 and DATE 2018. It has been used with ngspice and Cadence analog design environment (Virtuoso) in design of several components for two chips which have been manufactured and tested [1][2][3][4]. In these experiments, the results with ngspice were found to have negligible difference with cadence simulator for operational and instrumentation amplifiers designed in ams 350 nm technology. These tests were later extended to MAGIC Layout editor (open circuit design tool [5]) where manual designs in MAGIC were compared to the layouts in cadence with and without parasitics and the results showed negligible differences.



Beyond the other advantages and reasons for use of open source tools like privacy, there is a symbiotic relationship between ABSYNTH and other open source tools. The long term goal of ABSYNTH to run have simple user interface and run on massively parallel servers to have extremely fast and customized analog designs usable by experts and laymen alike. These goals cannot be achieved with a closed architectures and the licensing restrictions provided by current commercial tools.

The goals of ABSYNTH cannot be reached without working together with other open source tools and proving that the chips designed using these tools provide significant advantages over the current work flow used in industries. This requires a foundation of people working together and business models for FOS.

Acknowledgements: Most of the work for ABSYNTH was done at ISE, TU Kaiserslautern under the chair of Prof.Dr.-Ing Andreas König

References:

[1] Abhay Chandra Kammara, Lingaselvan Palanichamy, and Andreas König, "[Multi-Objective optimization and visualization for analog automation](#)", Complex. Intell. Syst, Springer, DOI 10.1007/s40747-016-0027-3, 2016

[2] A.C. Kammara A. König Pseudo-Hierarchical Optimization Strategies for Transparent Analog Design Automation Analog Workshop 2016 Leibniz Universität Hannover.

[3] A.C. Kammara A. König Second Generation of Universal Sensor Interface with Self-X Properties for Industry 4.0 Analog Workshop 2018 IMTEK Uni Freiburg.

[4] Abhaya C. Kammara S., S. Pontes-Filho, Andreas König , Towards Spiking Neutral Systems Synthesis, Swarm Intelligence Volume 3: Applications, Chapter 15, Edited by Dr.,Yin Tan 2018, ISBN: 978-1-78561-631-0

[5] <http://opencircuitdesign.com/magic/>