History and Future Opportunities in large-scale Field Programmable Analog Arrays

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Resumen:

Analog computation becomes relevant with the advent of large-scale Field Programmable Analog Arrays (FPAA) devices. Programmable and configurable large-scale analog circuits and systems enabling a typical factor of 1000 improvement in computational power (Energy) efficiency over their digital counterparts. Scaling of energy efficiency, performance, and size will be discussed. We will overview a few examples in this area as helps the resulting roadmap discussion, including speech, vision, and sensor interfaces. These techniques are even more critical given the saturation of computational energy efficiency of digital multiply accumulate structures, the key component for high-performance computing. Analog and digital systems have tools to model resolution and computational noise and computation energy; analog and digital approaches have their own optimal computing regions. We will discuss the first step in analog abstraction utilized in FPAA encoded in an open-source toolset. Abstraction of blocks in the FPAA block library makes the SoC FPAA ecosystem accessible to system-level designers while still enabling circuit designers the freedom to build at a low level.

Sobre Jennifer Hasler:

Jennifer Hasler (Senior Member, IEEE) received the M.S. and B.S.E. degrees in electrical engineering from Arizona State University in 1991, and the Ph.D. degree in computation and neural systems from the California Institute of Technology, in 1997. She is currently a Full Professor with the School of Electrical and Computer Engineering, Georgia Institute of Technology. Dr. Hasler received the Paul Raphorst Best Paper Award from the IEEE Electron Devices Society in 1997, the Best Paper Award from SCI in 2001, the NSF CAREER Award in 2001, the ONR YIP Award in 2002, the Best Paper from CICC in 2005, the Best Sensor Track Paper from ISCAS in 2005, the Best Paper Award from Ultrasound Symposium in 2006, and the Best Demonstration Paper Award from ISCAS in 2010.