

Early Power Estimation in Heterogeneous Designs Using SoCLib and SystemC-AMS

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Abstract. The presentation will describe a use case that consists in the modeling and simulation of a genuine heterogeneous system composed of individually powered Wireless Sensor Network nodes. The models are written in SoCLib and SystemC-AMS, an open-source C++ extension to the OSCI SystemC Standard dedicated to the description of AMS designs containing digital, analog, RF hardware as well as other disciplines. SoCLib is a library of digital IPs simulation models dedicated to the design of shared memory multiprocessor architectures. It is currently being extended to support power estimation at the bit-cycle-accurate level of abstraction.

Concretely, a power-aware system of WSN nodes will be detailed that can monitor a physical seismic perturbation, transmit information on this perturbation to other nodes by means of 2.4 GHz RF communication links, and finally compute the epicenter of the perturbation by asking the 32-bits processor embedded in a node to solve the system of nonlinear equations relative to the triangulation algorithm. Each node is powered by an autonomous kinetic battery model.