Model-Based Design of Embedded Systems

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Abstract

Model-Based Design is presented as consisting of four elements: (i) executable specification, (ii) design with simulation, (iii) implementation through code generation, and (iv) continuous test and verification. This presentation concentrates on the combined design and implementation as model elaboration. It is shown how the design of an edge detection filter can be systematically brought to an implementation by comparing a reference algorithm to an increasingly detailed representation of the implementation. Automatic program synthesis allows the generation of C code or a representation in a hardware description language (HDL). The HDL emulation can then be co-simulated in the system context to study behavior of an implementation at a cycle accurate level. This reduces expensive hardware iteration, facilitates analysis of system characteristics with detailed component implementation models, and mitigates the need for extensive testbench design.