

Design Methodology for FPGA Implementation of Lattice Piecewise-Affine Functions

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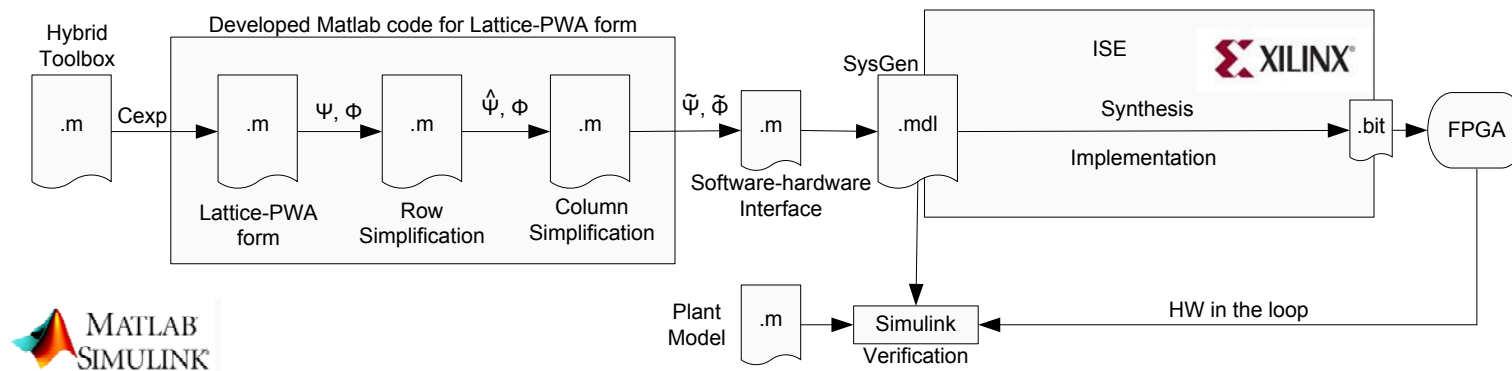
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- A piecewise-affine (PWA) function provides a linear (affine) output for each region in which the input domain, D , is partitioned.
- The lattice approach [1]
 - allows the implementation of any continuous PWA function.
 - selects the affine function without evaluating the boundaries.
- The algorithm extracts the lattice PWA representation using:
 - a simplified structure matrix \rightarrow relation between regions
 - A simplified parameter \rightarrow affine regions

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- The design methodology presented for FPGA implementation of continuous PWA functions based on lattice representation has been automated with Matlab&Simulink and ISE tools.
- The parameters required by the digital architecture are obtained from the algorithmic description of the problem.
- FPGA implementation results for applications in the control domain offer small size, high speed, and potentially no approximation error with regards to the optimum solution.