



Martin Kumm

Multiple Constant Multiplication Optimizations for Field Programmable Gate Arrays

• Technical Study

This work covers field programmable gate array (FPGA)-specific optimizations of circuits computing the multiplication of a variable by several constants, commonly denoted as multiple constant multiplication (MCM). These optimizations focus on low resource usage but high performance. They comprise the use of fast carry-chains in adder-based constant multiplications including ternary (3-input) adders as well as the integration of look-up table-based constant multipliers and embedded multipliers to get the optimal mapping to modern FPGAs. The proposed methods can be used for the efficient implementation of digital filters, discrete transforms and many other circuits in the domain of digital signal processing, communication and image processing.

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