

Hardware Implementation of Finite-Field Arithmetic (Electronic Engineering)

By Jean-Pierre Deschamps



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Implement Finite-Field Arithmetic in Specific Hardware (FPGA and ASIC)

Master cutting-edge electronic circuit synthesis and design with help from this detailed guide. *Hardware Implementation of Finite-Field Arithmetic* describes algorithms and circuits for executing finite-field operations, including addition, subtraction, multiplication, squaring, exponentiation, and division.

This comprehensive resource begins with an overview of mathematics, covering algebra, number theory, finite fields, and cryptography. The book then presents algorithms which can be executed and verified with actual input data. Logic schemes and VHDL models are described in such a way that the corresponding circuits can be easily simulated and synthesized. The book concludes with a real-world example of a finite-field application--elliptic-curve cryptography. This is an essential guide for hardware engineers involved in the development of embedded systems.

Get detailed coverage of:

- Modulo *m* reduction
- Modulo *m* addition, subtraction, multiplication, and exponentiation
- Operations over GF(p) and $GF(p^m)$
- Operations over the commutative ring $Z_p[x]/f(x)$
- Operations over the binary field $GF(2^m)$ using normal, polynomial, dual, and triangular



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Editorial Review

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Gustavo D. Sutter, Ph.D., is a professor at the Autonomous University of Madrid, Spain.

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