

Applications of Finite Fields (The Springer International Series in Engineering and Computer Science)



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The theory of finite fields, whose origins can be traced back to the works of Gauss and Galois, has played a part in various branches of mathematics, in recent years there has been a resurgence of interest in finite fields, and this is partly due to important applications in coding theory and cryptography. Applications of Finite Fields introduces some of these recent developments. This book focuses attention on some specific recent developments in the theory and applications of finite fields. While the topics selected are treated in some depth, Applications of Finite Fields does not attempt to be encyclopedic. Among the topics studied are different methods of representing the elements of a finite field (including normal bases and optimal normal bases), algorithms for factoring polynomials over finite fields, methods for constructing irreducible polynomials, the discrete logarithm problem and its implications to cryptography, the use of elliptic curves in constructing public key cryptosystems, and the uses of algebraic geometry in constructing good error-correcting codes. This book is developed from a seminar held at the University of Waterloo. The purpose of the seminar was to bridge the knowledge of the participants whose expertise and interests ranged from the purely theoretical to the applied. As a result, this book will be of interest to a wide range of students, researchers and practitioners in the disciplines of computer science, engineering and mathematics. Applications of Finite Fields is an excellent reference and may be used as a text for a course on the subject.

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