Jörg Rothe

# Complexity Theory and Cryptology

An Introduction to Cryptocomplexity



# **Complexity Theory And Cryptology**

Jörg Rothe

#### **Complexity Theory And Cryptology:**

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**Applications of Group Theory in Cryptography** Delaram Kahrobaei,Ram¢n Flores,Marialaura Noce,Maggie E.

Habeeb, Christopher Battarbee, 2024-03-25 This book is intended as a comprehensive treatment of group based cryptography accessible to both mathematicians and computer scientists with emphasis on the most recent developments in the area To make it accessible to a broad range of readers the authors started with a treatment of elementary topics in group theory combinatorics and complexity theory as well as providing an overview of classical public key cryptography Then some algorithmic problems arising in group theory are presented and cryptosystems based on these problems and their respective cryptanalyses are described The book also provides an introduction to ideas in quantum cryptanalysis especially with respect to the goal of post quantum group based cryptography as a candidate for quantum resistant cryptography The final part of the book provides a description of various classes of groups and their suitability as platforms for group based cryptography The book is a monograph addressed to graduate students and researchers in both mathematics and computer science

Topics in Geometry, Coding Theory and Cryptography Arnaldo Garcia, Henning Stichtenoth, 2006-11-15 The theory of algebraic function fields over finite fields has its origins in number theory However after Goppa's discovery of algebraic geometry codes around 1980 many applications of function fields were found in different areas of mathematics and information theory such as coding theory sphere packings and lattices seguence design and cryptography The use of function fields often led to better results than those of classical approaches This book presents survey articles on some of these new developments Most of the material is directly related to the interaction between function fields and their various applications in particular the structure and the number of rational places of function fields are of great significance The topics focus on material which has not yet been presented in other books or survey articles Wherever applications are pointed out a special effort has been made to present some background concerning their use Advances in Cryptology - EUROCRYPT 2025 Serge Fehr, Pierre-Alain Fouque, 2025-04-27 This eight volume set LNCS 15601 15608 constitutes the proceedings of the 44th Annual International Conference on the Theory and Applications of Cryptographic Techniques EUROCRYPT 2025 held in Madrid Spain during May 4 8 2025 The 123 papers included in these proceedings were carefully reviewed and selected from 602 submissions They are organized in topical sections as follows Part I Secure Multiparty Computation I Part II Public Key Cryptography and Key Exchange Part III Advanced Cryptographic Schemes Part IV Non Interactive Proofs and Zero Knowledge Part V Secure Multiparty Computation II Part VI MPC II Private Information Retrieval and Garbling Algorithms and Attacks Part VII Theoretical Foundations Part VIII Real World Cryptography **Theory of Cryptography** Salil P. Vadhan, 2007-02-07 This book constitutes the refereed proceedings of the 4th Theory of Cryptography Conference TCC 2007 held in Amsterdam The Netherlands in February 2007 The 31 revised full papers cover encryption universally composable security arguments and zero knowledge notions of security obfuscation secret sharing and multiparty computation signatures and watermarking private approximation and black box reductions and key establishment Coding Theory and Cryptology Harald Niederreiter, 2002 The inaugural research program of the Institute for Mathematical Sciences at the National

University of Singapore took place from July to December 2001 and was devoted to coding theory and cryptology As part of the program tutorials for graduate students and junior researchers were given by world renowned scholars These tutorials covered fundamental aspects of coding theory and cryptology and were designed to prepare for original research in these areas The present volume collects the expanded lecture notes of these tutorials The topics range from mathematical areas such as computational number theory exponential sums and algebraic function fields through coding theory subjects such as extremal problems quantum error correcting codes and algebraic geometry codes to cryptologic subjects such as stream ciphers public key infrastructures key management authentication schemes and distributed system security Geometry in Coding Theory and Cryptography Harald Niederreiter, Chaoping Xing, 2009-09-21 This textbook equips graduate students and advanced undergraduates with the necessary theoretical tools for applying algebraic geometry to information theory and it covers primary applications in coding theory and cryptography Harald Niederreiter and Chaoping Xing provide the first detailed discussion of the interplay between nonsingular projective curves and algebraic function fields over finite fields This interplay is fundamental to research in the field today yet until now no other textbook has featured complete proofs of it Niederreiter and Xing cover classical applications like algebraic geometry codes and elliptic curve cryptosystems as well as material not treated by other books including function field codes digital nets code based public key cryptosystems and frameproof codes Combining a systematic development of theory with a broad selection of real world applications this is the most comprehensive yet accessible introduction to the field available Introduces graduate students and advanced undergraduates to the foundations of algebraic geometry for applications to information theory Provides the first detailed discussion of the interplay between projective curves and algebraic function fields over finite fields Includes applications to coding theory and cryptography Covers the latest advances in algebraic geometry codes Features applications to cryptography not treated in other books

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