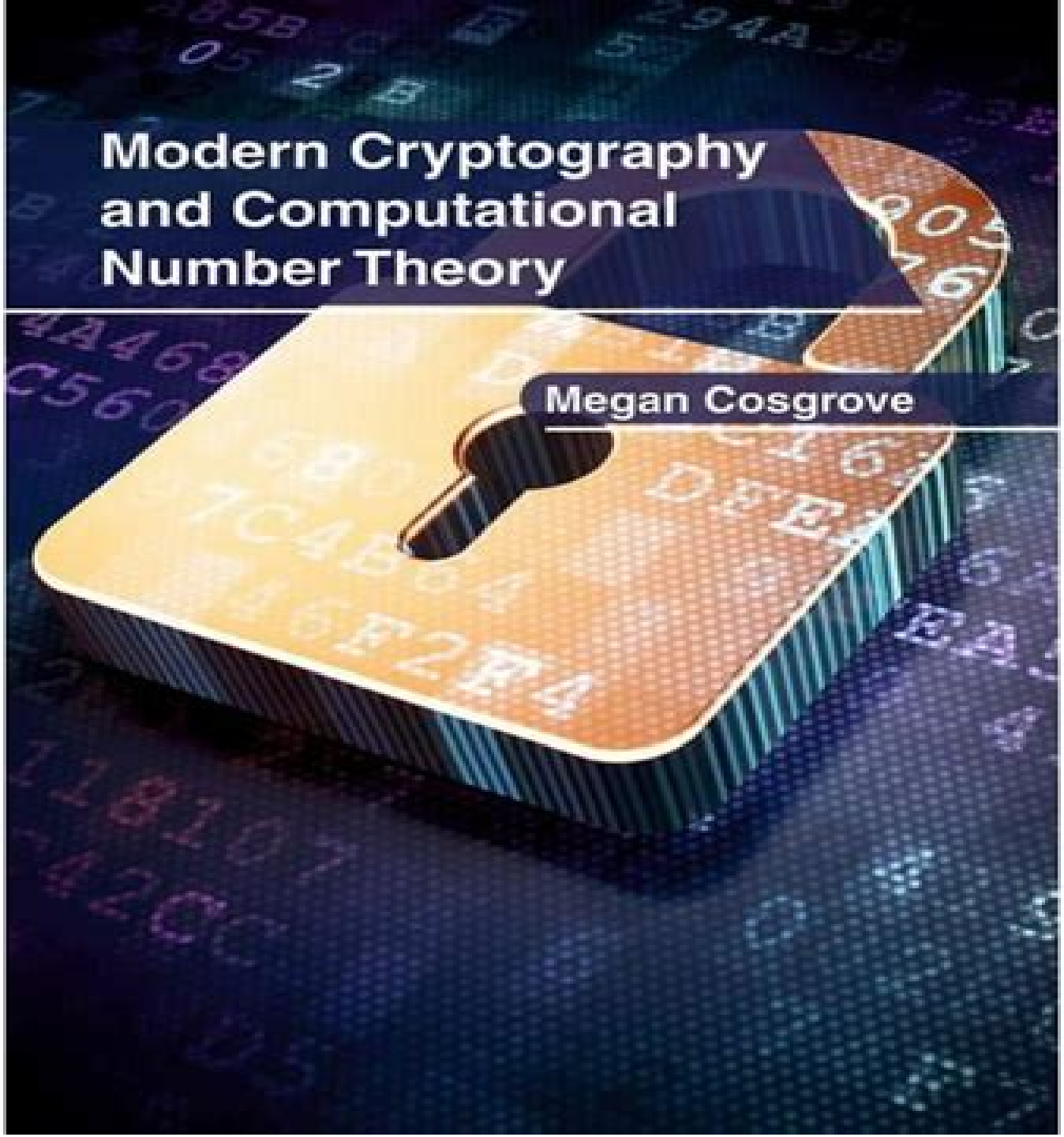
Modern Cryptography
and Computational
Number Theory
Megan Cosgrove

Computational Number Theory And Modern Cryptography

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Cryptography and Computational Number Theory Kwok Yan Lam,2001 The fields of cryptography and computational number theory have recently witnessed a rapid development which was the subject of the CCNT workshop in Singapore in November 1999 Its aim was to stimulate further research in information and computer security as well as the design and implementation of number theoretic cryptosystems and other related areas Another achievement of the meeting was the collaboration of mathematicians computer scientists practical cryptographers and engineers in academia industry and government The present volume comprises a selection of refereed papers originating from this event presenting either a survey of some area or original and new results They concern many different aspects of the field such as theory techniques applications and practical experience It provides a state of the art report on some number theoretical issues of significance to cryptography **Modern Cryptography and Computational Number Theory** Megan Cosgrove,2018-02-02 The process of securing communication and encoding all types of electronic and computer communication is known as cryptography It is used to secure information from the third parties The main concepts on which modern cryptography is based are authentication non repudiation data integrity confidentiality and data integrity Cryptography uses elements of mathematics

especially the computational number theory to encrypt the messages This book studies analyses and upholds the pillars of cryptography and its utmost significance in modern times The topics covered in it deal with the core aspects of the area This textbook is a complete source of knowledge on the present status of this important field Quantum Computational Number Theory Song Y. Yan,2015-12-26 This book provides a comprehensive introduction to advanced topics in the computational and algorithmic aspects of number theory focusing on applications in cryptography Readers will learn to develop fast algorithms including quantum algorithms to solve various classic and modern number theoretic problems Key problems include prime number generation primality testing integer factorization discrete logarithms elliptic curve arithmetic conjecture and numerical verification The author discusses quantum algorithms for solving the Integer Factorization Problem IFP the Discrete Logarithm Problem DLP and the Elliptic Curve Discrete Logarithm Problem ECDLP and for attacking IFP DLP and ECDLP based cryptographic systems Chapters also cover various other quantum algorithms for Pell s equation principal ideal unit group class group Gauss sums prime counting function Riemann s hypothesis and the BSD conjecture Quantum Computational Number Theory is self contained and intended to be used either as a graduate text in computing communications and mathematics or as a basic reference in the related fields Number theorists cryptographers and professionals working in quantum computing cryptography and network security will find this book a valuable asset

Cryptography and Computational Number Theory Kwok Y. Lam,Igor Shparlinski,Huaxiong Wang,Chaoping Xing,2013-03-07 This volume contains the refereed proceedings of the Workshop on Cryptography and Computational Number Theory CCNT 99 which has been held in Singapore during the week of November 22 26 1999 The workshop was organized by the Centre for Systems Security of the Na tional University of Singapore We gratefully acknowledge the financial support from the Singapore National Science and Technology Board under the grant num ber RP960668 M The idea for this workshop grew out of the recognition of the recent rapid development in various areas of cryptography and computational number the ory The event followed the concept of the research programs at such well known research institutions as the Newton Institute UK Oberwolfach and Dagstuhl Germany and Luminy France Accordingly there were only invited lectures at the workshop with plenty of time for informal discussions It was hoped and successfully achieved that the meeting would encourage and stimulate further research in information and computer security as well as in the design and implementation of number theoretic cryptosystems and other related areas Another goal of the meeting was to stimulate collaboration and more active interaction between mathematicians computer scientists practical cryptographers and engineers in academia industry and government **Cybercryptography: Applicable Cryptography for Cyberspace Security** Song Y. Yan,2018-12-04 This book provides the basic theory techniques and algorithms of modern cryptography that are applicable to network and cyberspace security It consists of the following nine main chapters Chapter 1 provides the basic concepts and ideas of cyberspace and cyberspace security Chapters 2 and 3 provide an introduction to mathematical

and computational preliminaries respectively Chapters 4 discusses the basic ideas and system of secret key cryptography whereas Chapters 5 6 and 7 discuss the basic ideas and systems of public key cryptography based on integer factorization discrete logarithms and elliptic curves respectively Quantum safe cryptography is presented in Chapter 8 and offensive cryptography particularly cryptovirology is covered in Chapter 9 This book can be used as a secondary text for final year undergraduate students and first year postgraduate students for courses in Computer Network and Cyberspace Security Researchers and practitioners working in cyberspace security and network security will also find this book useful as a reference *Cryptology and Computational Number Theory* Carl Pomerance,Shafi Goldwasser,1990 In the past dozen or so years cryptology and computational number theory have become increasingly intertwined Because the primary cryptologic application of number theory is the apparent intractability of certain computations these two fields could part in the future and again go their separate ways But for now their union is continuing to bring ferment and rapid change in both subjects This book contains the proceedings of an AMS Short Course in Cryptology and Computational Number Theory held in August 1989 during the Joint Mathematics Meetings in Boulder Colorado These eight papers by six of the top experts in the field will provide readers with a thorough introduction to some of the principal advances in cryptology and computational number theory over the past fifteen years In addition to an extensive introductory article the book contains articles on primality testing discrete logarithms integer factoring knapsack cryptosystems pseudorandom number generators the theoretical underpinnings of cryptology and other number theory based cryptosystems Requiring only background in elementary number theory this book is aimed at nonexperts including graduate students and advanced undergraduates in mathematics and computer science Quantum Attacks on Public-Key Cryptosystems Song Y. Yan,2014-07-08 The cryptosystems based on the Integer Factorization Problem IFP the Discrete Logarithm Problem DLP and the Elliptic Curve Discrete Logarithm Problem ECDLP are essentially the only three types of practical public key cryptosystems in use The security of these cryptosystems relies heavily on these three infeasible problems as no polynomial time algorithms exist for them so far However polynomial time quantum algorithms for IFP DLP and ECDLP do exist provided that a practical quantum computer exists Quantum Attacks on Public Key Cryptosystems presemts almost all known quantum computing based attacks on public key cryptosystems with an emphasis on quantum algorithms for IFP DLP and ECDLP It also discusses some quantum resistant cryptosystems to replace the IFP DLP and ECDLP based cryptosystems This book is intended to be used either as a graduate text in computing communications and mathematics or as a basic reference in the field *Farey Sequences* Andrey O. Matveev,2017-11-07 As a first comprehensive overview on Farey sequences and subsequences this monograph is intended as a reference for anyone looking for specific material or formulas related to the subject Duality of subsequences and maps between them are discussed and explicit proofs are shown in detail From the Content Basic structural and enumerative properties of Farey sequences Collective decision making Committee methods in pattern recognition Farey

duality Farey sequence Fundamental Farey subsequences Monotone bijections between Farey subsequences End-to-End Encrypted Messaging Rolf Oppliger,2020-04-30 This exciting resource introduces the core technologies that are used for Internet messaging The book explains how Signal protocol the cryptographic protocol that currently dominates the field of end to end encryption E2EE messaging is implemented and addresses privacy issues related to E2EE messengers The Signal protocol and its application in WhatsApp is explored in depth as well as the different E2EE messengers that have been made available in the last decade are also presented including SnapChat It addresses the notion of self destructing messages as originally introduced by SnapChat and the use of metadata to perform traffic analysis A comprehensive treatment of the underpinnings of E2EE messengers including Pretty Good Privacy PGP and OpenPGP as well as Secure Multipurpose Internet Mail Extensions S MIME is given to explain the roots and origins of secure messaging as well as the evolutionary improvements to PGP OpenPGP and S MIME that have been proposed in the past In addition to the conventional approaches to secure messaging it explains the modern approaches messengers like Signal are based on The book helps technical professionals to understand secure and E2EE messaging on the Internet and to put the different approaches and solutions into perspective

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Table of Contents Computational Number Theory And Modern Cryptography

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