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This book presents a self-contained overview of the state of the art in the complexity of lattice problems, with particular emphasis on problems that are related to the construction of cryptographic functions.

Complexity of Lattice Problems: A Cryptographic ...

The study of lattices, specifically from a computational point of view, was marked by two major breakthroughs: the development of the LLL lattice reduction algorithm by Lenstra, Lenstra and Lovasz in the early 80's, and Ajtai's discovery of a connection between the worst-case and average-case

hardness of certain lattice problems in the late 90's.

Complexity of Lattice Problems - A Cryptographic ...
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Complexity of Lattice Problems: A Cryptographic Perspective is an essential reference for those researching ways in which lattice problems can be used to build cryptographic systems. It will also be of interest to those working in computational complexity, combinatorics, and foundations of cryptography. The book presents a self-contained overview of the state of the art in the complexity of lattice problems, with particular emphasis on problems that are related to the construction of ...

Complexity of lattice problems: a cryptographic perspective
In other words, A is a discrete additive subgroup of m . - f6 COMPLEXITY OF LATTICE PROBLEMS Determinant 1.1 The determinant of a lattice A = £ (B), denoted det (A), is the n dimensional volume of the fundamental parallelepiped P (B) spanned by the basis vectors. (See shaded areas in Figures 1.1 and 1.2.)

Complexity of Lattice Problems: A Cryptographic ...

Complexity of lattice problems: a cryptographic perspective By Daniele Micciancio and Shafi Goldwasser Topics: Mathematical Physics and Mathematics

Complexity of lattice problems: a cryptographic ...
Abstract. We survey some recent developments in the study of the complexity of certain lattice problems. We focus on the recent progress on complexity results of intractability. We will discuss Ajtai's worst-case/average-case connections for the shortest vector problem, similar results for the closest vector problem and short basis problem, NP-hardness and non-NP-hardness, transference theorems between primal and dual lattices, and application to secure cryptography.

The Complexity of Some Lattice Problems | SpringerLink
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May 21, 2007. Abstract Lattice problems are known to be hard to approximate to within sub-polynomial factors. For larger approximation factors, such as. p n,

lattice problems are known to be in complexity classes such as NP\coNP and are hence unlikely to be NP-hard. Here we survey known results in this area.

On the Complexity of Lattice Problems with Polynomial ...

In computer science, lattice problems are a class of optimization problems related to mathematical objects called lattices. The conjectured intractability of such problems is central to the construction of secure lattice-based cryptosystems: Lattice problems are an example of NP-hard problems which have been shown to be average-case hard, providing a test case for the security of cryptographic algorithms. In addition, some lattice problems which are worst-case hard can be used as a basis for ext

Lattice problem - Wikipedia

In [4] it was shown that exactly solving the lattice basis reduction problem is equivalent in complexity to solving the closest vector problem, meaning that at least hyper-exponential complexity ...

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Noah Stephens-Davidowitz (MIT) Lattices: Algorithms, Complexity, and Cryptography Boot Camp https://sim ons.berkeley.edu/talks/complexity-lattice-problems-0

Complexity of Lattice Problems

about lattices and complexity theory Complexity of lattice problems a cryptographic perspective-Complexity of Lattice Problems A Cryptographic Perspective is an essential reference for those researching ways in which lattice problems can be used to build cryptographic systems It will also be of interest to those working in computational complexity

Complexity Of Lattice Problems

However, before lattice cryptography goes live, we need major advances in understanding the hardness of lattice problems that underlie the security of these cryptosystems. Significant, groundbreaking progress on these questions requires a concerted effort by

researchers from many areas: (algebraic) number theory, (quantum) algorithms, optimization, cryptography, and coding theory.

Lattices: Algorithms, Complexity, and Cryptography ... Pris: 1259 kr. Häftad, 2012. Skickas inom 10-15 vardagar. Köp Complexity of Lattice Problems av Daniele Micciancio, Shafi Goldwasser på Bokus.com.

Lattices are geometric objects that can be pictorially described as the set of intersection points of an infinite, regular n-dimensional grid. De spite their apparent simplicity, lattices hide a rich combinatorial struc ture, which has attracted the attention of great mathematicians over the last two centuries. Not surprisingly, lattices have found numerous ap plications in mathematics and computer science, ranging from number theory and Diophantine approximation, to combinatorial optimization and cryptography. The study of lattices, specifically from a computational point of view, was marked by two major breakthroughs: the development of the LLL lattice reduction algorithm by Lenstra, Lenstra and Lovasz in the early 80's, and Ajtai's discovery of a connection between the worst-case and average-case hardness of certain lattice problems in the late 90's. The LLL algorithm, despite the relatively poor quality of the solution it gives in the worst case, allowed to devise polynomial time solutions to many classical problems in computer science. These include, solving integer programs in a fixed number of variables, factoring polynomials over the rationals, breaking

knapsack based cryptosystems, and finding solutions to many other Diophantine and cryptanalysis problems.

Complexity of Lattice Problems: A Cryptographic Perspective is an essential reference for those researching ways in which lattice problems can be used to build cryptographic systems. It will also be of interest to those working in computational complexity, combinatorics, and foundations of cryptography. The book presents a self-contained overview of the state of the art in the complexity of lattice problems, with particular emphasis on problems that are related to the construction of cryptographic functions. Specific topics covered are the strongest known inapproximability result for the shortest vector problem; the relations between this and other computational lattice problems; an exposition of how cryptographic functions can be built and prove secure based on worst-case hardness assumptions about lattice problems; and a study of the limits of non-approximability of lattice problems. Some background in complexity theory, but no prior knowledge about lattices, is assumed. The aim of the authors is to make lattice-based cryptography accessible to a wide audience, ultimately yielding further research and applications. Complexity of Lattice Problems: A Cryptographic Perspective will be valuable to anyone working in this fast-moving field. It serves as an excellent reference, providing insight into some of the most challenging issues being examined today.

The first book to offer a comprehensive view of the LLL algorithm, this text surveys computational aspects of Euclidean lattices and their main applications. It includes many detailed motivations, explanations and examples.

New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.

This book constitutes the thoroughly refereed post-proceedings of the International Conference on Cryptography and Lattices, CaLC 2001, held in Providence, RI, USA in March 2001. The 14 revised full papers presented together with an overview paper were carefully reviewed and selected for inclusion in the book. All current aspects of lattices and lattice reduction in cryptography, both for cryptographic construction and cryptographic analysis, are addressed.

Surveys most of the major developments in lattice cryptography over the past ten years. The main focus is on the foundational short integer solution (SIS) and learning with errors (LWE) problems, their provable hardness assuming the worst-case intractability of standard lattice problems, and their many cryptographic applications.

This book constitutes the refereed proceedings of the 29th Annual International Conference on the Theory and Applications of Cryptographic Techniques,

EUROCRYPT 2010, held on the French Riviera, in May/June 2010. The 33 revised full papers presented together with 1 invited lecture were carefully reviewed and selected from 188 submissions. The papers address all current foundational, theoretical and research aspects of cryptology, cryptography, and cryptanalysis as well as advanced applications. The papers are organized in topical sections on cryptosystems; obfuscation and side channel security; 2-party protocols; cryptanalysis; automated tools and formal methods; models and proofs; multiparty protocols; hash and MAC; and foundational primitives.

This book constitutes the refereed proceedings of the 29th Annual International Cryptology Conference, CRYPTO 2009, held in Santa Barbara, CA, USA in August 2009. The 38 revised full papers presented were carefully reviewed and selected from 213 submissions. Addressing all current foundational, theoretical and research aspects of cryptology, cryptography, and cryptanalysis as well as advanced applications, the papers are organized in topical sections on key leakage, hash-function cryptanalysis, privacy and anonymity, interactive proofs and zero-knowledge, block-cipher cryptanalysis, modes of operation, elliptic curves, cryptographic hardness, merkle puzzles, cryptography in the physical world, attacks on signature schemes, secret sharing and secure computation, cryptography and game-theory, cryptography and lattices, identity-based encryption and cryptographers' toolbox.

Modern cryptology increasingly employs mathematically rigorous concepts and methods from

complexity theory. Conversely, current research topics in complexity theory are often motivated by questions and problems from cryptology. This book takes account of this situation, and therefore its subject is what may be dubbed "cryptocomplexity'', a kind of symbiosis of these two areas. This book is written for undergraduate and graduate students of computer science, mathematics, and engineering, and can be used for courses on complexity theory and cryptology, preferably by stressing their interrelation. Moreover, it may serve as a valuable source for researchers, teachers, and practitioners working in these fields. Starting from scratch, it works its way to the frontiers of current research in these fields and provides a detailed overview of their history and their current research topics and challenges.