

Quantum Computational Complexity Arxiv

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This article surveys quantum computational complexity, with a focus on three fundamental notions: polynomial-time quantum computations, the efficient verification of quantum proofs, and quantum interactive proof systems. Properties of quantum complexity classes based on these notions, such as BQP, QMA, and QIP, are presented.

~~[0804.3401] Quantum Computational Complexity - arXiv~~

arXiv:0804.3401v1 [quant-ph] 21 Apr 2008 Quantum Computational Complexity John Watrous Institute for Quantum Computing and School of Computer Science University of Waterloo, Waterloo, Ontario, Canada. Article outline I. De?nition of the subject and its importance II. Introduction III. The quantum circuit model IV. Polynomial-time quantum computations

~~Quantum Computational Complexity—arXiv~~

This article surveys quantum computational complexity, with a focus on three fundamental notions: polynomial-time quantum computations, the efficient verification of quantum proofs, and quantum interactive proof systems. Properties of quantum complexity classes based on these notions, such as BQP, QMA, and QIP, are presented.

~~[0804.3401v1] Quantum Computational Complexity—arXiv.org~~

arXiv:quant-ph/9906111v1 28 Jun 1999 An Introduction to Quantum Complexity Theory Richard Cleve University of Calgary? Abstract We give a basic overview of computational complexity, query complexity, and communication complexity, with quantum information incorporated into each of these scenarios. The aim is to provide simple

~~An Introduction to Quantum Complexity Theory—arXiv~~

complexity of the most efficient representation known to-date for both a random permutation over n -bit strings and a deep n -qubit random quantum circuit classically are exponential in n . Our results therefore point to an unknown relation between the learnability of bitstring samples and the underlying computational complexity of the distribution.

~~Learnability and Complexity of Quantum Samples—arxiv.org~~

Subjects: Quantum Physics (quant-ph); Computational Complexity (cs.CC); Optimization and Control (math.OC) Wed, 5 Aug 2020 [4]
arXiv:2008.01316 [pdf , ps , other]

~~Computational Complexity—arXiv~~

Quantum computing is the use of quantum phenomena such as superposition and entanglement to perform computation. Computers that perform quantum computations are known as quantum computers.: I-5 Quantum computers are believed to be able to solve certain computational problems, such as integer factorization (which underlies RSA encryption), substantially faster than classical computers.

~~Quantum computing—Wikipedia~~

Complexity arguments concern how the amount of some resource needed to solve a problem (generally time or memory) scales with the size of the input. As an extension of classical computational complexity theory, quantum complexity theory considers what a theoretical universal quantum computer could accomplish without necessarily accounting for the difficulty of building a physical quantum ...

~~Quantum supremacy—Wikipedia~~

One of the most promising suggested applications of quantum computing is solving classically intractable chemistry problems. This may help to answer unresolved questions about phenomena like: high temperature superconductivity, solid-state physics, transition metal catalysis, or certain biochemical reactions. In turn, this increased understanding may help us to refine, and perhaps even one day ...

~~[1808.10402] Quantum computational chemistry — arXiv.org~~

Quantum Physics (quant-ph); Strongly Correlated Electrons (cond-mat.str-el); Computational Complexity (cs.CC) Journal reference: Foundations and Trends in Theoretical Computer Science: Vol. 10: No. 3, pp 159-282, 2015: DOI: 10.1561/04000000066: Cite as: arXiv:1401.3916 [quant-ph] (or arXiv:1401.3916v4 [quant-ph] for this version)

~~[1401.3916] Quantum Hamiltonian Complexity — arXiv.org~~

We study the relation between quantum computational complexity and general relativity. The quantum computational complexity is proposed to be quantified by the shortest length of geodesic quantum curves. We examine the complexity/volume duality in a geodesic causal ball in the framework of Fermi normal coordinates and derive the full non-linear Einstein equation. Using insights from the ...

~~Quantum computational complexity ... — arxiv-vanity.com~~

Computational Complexity Authors and titles for recent submissions. Fri, 10 Jul 2020; Thu, 9 Jul 2020; Wed, 8 Jul 2020; Tue, 7 Jul 2020; Mon, 6 Jul 2020 [total of 18 entries: 1-18] [showing up to 25 entries per page: fewer | more] Fri, 10 Jul 2020 arXiv:2007.04620 (cross-list from cs.LO) [pdf, other]

~~Computational Complexity — arXiv~~

The inherent difficulty, or hardness, of computational problems is a fundamental concept in computational complexity theory. Hardness is typically formalized in terms of the resou

~~Quantum Computational Complexity — arxiv-vanity.com~~

Quantum computational supremacy arguments, which describe a way for a quantum computer to perform a task that cannot also be done by a classical computer, typically require some sort of computational assumption related to the limitations of classical computation.

~~How many qubits are needed for quantum computational ...~~

The popular method for giving quantitative rigour to the various notions of quantum information processing involves asymptotic computational complexity analysis, which involves finding upper- and lower bounds on the resource requirements of certain algorithmic tasks (usually classically defined) in the asymptotic limit of arbitrarily large problem instances, when certain constraints apply. Resource requirements can include a range of parameterisable constraints, most notably TIME and SPACE ...

~~Quantum Complexity: restrictions on ... — arXiv Vanity~~

Quantum complexity theory is the subfield of computational complexity theory that deals with complexity classes defined using quantum computers, a computational model based on quantum mechanics. It studies the hardness of computational problems in relation to these complexity classes, as well as the relationship between quantum complexity classes and classical complexity classes. Two important

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quantum complexity classes are BQP and QMA.

~~Quantum complexity theory—Wikipedia~~

Quantum logic generalizes, and in dimension one coincides with, Boolean logic. We show that the satisfiability problem of quantum logic formulas is NP-complete in dimension two as well. For higher higher-dimensional spaces \mathbb{R}^d and \mathbb{C}^d with $d \geq 3$ fixed, we establish quantum satisfiability to be polynomial time equivalent to the real feasibility of a multivariate quartic polynomial equation: a ...

~~Computational Complexity of Quantum ...—arxiv-vanity.com~~

We study the Hamiltonian-independent contribution to the complexity of quantum optimal control problems. The optimization of controls that steer quantum systems to desired objectives can itself be considered a classical dynamical system that executes an analog computation. The system-independent component of the equations of motion of this dynamical system can be integrated analytically for ...

~~Computational complexity of quantum ...—arxiv-vanity.com~~

The inherent difficulty, or hardness, of computational problems is a fundamental concept in computational complexity theory. Hardness is typically formalized in terms of the resources required by different models of computation to solve problems, such as the number of steps of a deterministic Turing machine.

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