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Autore	Imre Sandor
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6 Quantum Fourier Transform and its Applications6.1 Quantum Fourier Transform; 6.2 Quantum Phase Estimation; 6.2.1 Idealistic phase estimation; 6.2.2 Phase estimation in practical cases; 6.2.3 Quantitative analysis of the phase estimator; 6.2.4 Estimating quantum uncertainty; 6.3 Order Finding and Factoring - Shor Algorithm; 6.3.1 Connection between factoring and order finding; 6.3.2 Quantum-based order finding; 6.3.3 Error analysis and a numerical example; 6.4 QFT as generalized Hadamard transform; 6.5 Generalizations of order finding; 6.5.1 Period finding
6.5.2 Two-dimensional period finding and discrete logarithm6.6 Further Reading; Part III Quantum-assisted Solutions of Infocom Problems; 7 Searching in an Unsorted Database; 7.1 The Basic Grover Algorithm; 7.1.1 Initialization - quantum parallelism; 7.1.2 First stage of G - the Oracle; 7.1.3 Second stage of G - inversion about the average; 7.1.4 Required number of iterations; 7.1.5 Error analysis; 7.2 Quantum Counting; 7.2.1 Quantum counting based on phase estimation; 7.2.2 Error analysis; 7.2.3 Replacing quantum counting with indirect estimation on M; 7.3 Quantum Existence Testing
7.3.1 Error analysis

Sommario/riassunto

Quantum computers will revolutionize the way telecommunications networks function. Quantum computing holds the promise of solving problems that would be intractable with conventional computers by implementing principles from quantum physics in the development of computer hardware, software and communications equipment. Quantum-assisted computing will be the first step towards full quantum systems, and will cause immense disruption of our traditional networks. The world's biggest manufacturers are investing large amounts of resources to develop crucial quantum-assisted circuits and d