



Texts in Theoretical Computer Science
An EATCS Series

Texts published in this series are intended mostly for the graduate level. Typically, an undergraduate background in computer science will be assumed. However, the background required varies from topic to topic, and some books are self-contained. The texts cover both modern and classical areas with an innovative approach that may give them additional value as monographs. Most books in this series have examples and exercises.

Clote · Kranakis

Boolean Functions and Computation Models

This advanced textbook is a survey of the present state of research in the study of boolean functions, formulas, circuits, propositional proof systems, and models of computation. All of these subjects are related to the overriding concern of how computation can be modeled, and what limitations and interrelations there are between different computation models.

Starting with methods for the construction of boolean circuits which compute certain arithmetic and combinatorial functions, upper and lower bounds for circuit families are investigated. The techniques used are from combinatorics, probability and finite group theory. Then a survey is given on steps taken in a program initiated by S.A. Cook for investigating non-deterministic polynomial time, from a proof-theoretic viewpoint. Specifically, lower bounds are presented for lengths of proofs for families of propositional tautologies, when proven in certain proof systems. Techniques here involve both logic and finite combinatorics and are related to constant-depth boolean circuits and to monotone arithmetic circuits.

Numerous exercises at the end of each chapter enhance understanding of the material and expand research topics covered. Thus, the book will benefit advanced undergraduate and graduate students as well as researchers in the field of complexity theory.

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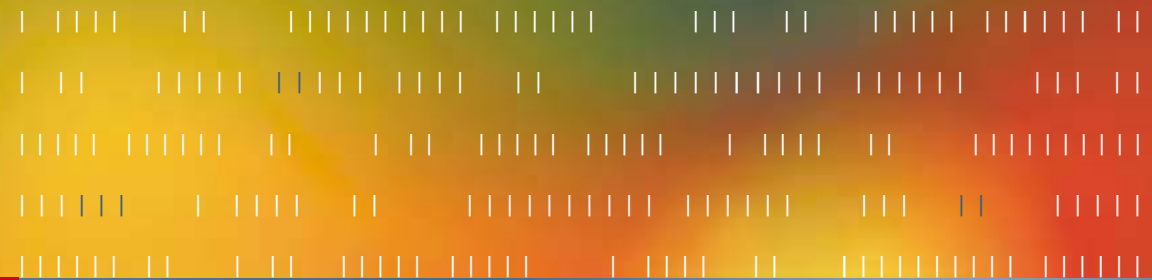
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