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Discrete Applied Mathematics 25 (1989) 1
North-Holland

PREFACE

In recent years, the interplay between combinatorial theory and complexity theory has picked up steam. For example, several important open problems concerning sorting networks, lower bounds for computation time or circuit size, and the relative power of Turing machines have been solved using techniques from expander graphs, probabilistic graph theory, set-systems, and Ramsey theory. At the same time, research in random graphs was stimulated by probabilistic analysis of algorithms in complexity theory, questions about partial orders were motivated by ones about fast sorting algorithms, and in general prominent mathematicians worked on designing efficient algorithms for combinatorial problems or on classifying their complexity.

Discrete Applied Mathematics has a strong interest in this fruitful interaction area, and it was looking for an opportunity to publish in it. Such an opportunity arose in the form of the *Combinatorics and Complexity Conference*, presented as part of its emphasis year on combinatorics and complexity by the Department of Mathematics, Statistics, and Computer Science of the University of Illinois at Chicago on June 15–19, 1987. Supported in part by the University, the National Science Foundation, the Argonne Universities Trust Fund, and the Institute for Mathematics and its Applications, the conference drew a relatively large number of leading experts, who presented 24 invited and 34 contributed talks and many open problems in both disciplines, and served to broaden the interaction between them.

This special issue presents some of the works heard in the conference. A careful selection process has been undertaken with the generous help of referees. The papers cover a wide spectrum of topics in both fields: coding theory, computational complexity, enumerative combinatorics, probabilistic graph theory, combinatorial game theory, algebra, group theory, knot theory, asymptotic analysis, pattern matching, design theory, and concrete computational complexity. It is hoped that this journal and others will be able to devote a regular portion of their output to these meeting points of combinatorics and complexity.

In addition to the authors and the referees, I should like to thank the invited members of the organizing comittee László Babai, Zvi Galil, László Lovász, and Richard Wilson, as well as my colleagues in the committee Wolfgang Maass and Vera Pless, the sponsoring institutions, the Program Coordinator Mary Dybas, and last but not least the tireless efforts of Kathy Kelly. Without their contributions, this issue would not have gone to print.

Uri N. PELED