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and Theoretical Computer Science

Volume 64

Unusual Applications of Number Theory

DIMACS Workshop
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January 10 – 14, 2000
DIMACS Center

Melvyn B. Nathanson
Editor

American Mathematical Society

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Foreword

A workshop on Unusual Applications of Number Theory was held at Rutgers University on January 10-14, 2000. We would like to express our appreciation to George Andrews, David Chudnovsky, Ron Graham, Jeff Lagarias, Victor Miller, Mel Nathanson, Andrew Odlyzko, and Carl Pomerance for their efforts to organize and plan this successful conference.

Number theory is an old and fascinating topic of great interest in and of itself, but one with a remarkably large number of applications in and connections to other areas of research, many of them not so well known. This workshop was centered around applications and interactions of number theory with other areas of science and of mathematics. Topics explored included physics, combinatorics, ergodic theory, spectral theory, geometry, and numerical analysis, as well as the more "standard" topics of computer science and cryptography.

DIMACS gratefully acknowledges the generous support that makes these programs possible. The National Science Foundation and the New Jersey Commission on Science and Technology, DIMACS' partners at Rutgers, Princeton, AT&T Labs-Research, Bell Labs, NEC Laboratories America, and Telcordia Technologies, and its affiliated partners at Avaya Labs, HP Labs, IBM Research, and Microsoft Research have generously supported the workshop program at DIMACS that makes this type of workshop possible.

Fred S. Roberts
Director

Robert Tarjan
Co-Director for Princeton

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Preface

These are the proceedings of the DIMACS Workshop on Unusual Applications of Number Theory, which was held at the DIMACS Center of Rutgers University in Piscataway, New Jersey, on January 10–14, 2000. The usual applications of number theory are to computer science and cryptology. In this workshop, the organizers looked for other applications of number theory, as well as topics in number theory with potential applications in science and engineering.

The organizing committee of this workshop was Mel Nathanson (Chair), George Andrews, David Chudnovsky, Ron Graham, Jeff Lagarias, Victor Miller, Andrew Odlyzko, and Carl Pomerance. I thank the members of this committee for their help in suggesting and inviting speakers to this meeting.

It was a pleasure to work with DIMACS Director Fred Roberts and his staff on this workshop. I am especially grateful to Mel Janowitz of DIMACS, who provided crucial and efficient editorial assistance with these proceedings, and who made sure that the LaTex files of the papers in this volume satisfied AMS publication requirements.

Partial support for this conference was provided by the National Science Foundation and the New Jersey Commission on Science and Technology.

Melvyn B. Nathanson
Short Hills, New Jersey
January 16, 2004

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This volume contains the proceedings of the workshop held at the DIMACS Center of Rutgers University (Piscataway, NJ) on Unusual Applications of Number Theory. Standard applications of number theory are to computer science and cryptology. In this volume, well-known number theorist, Melvyn B. Nathanson, gathers articles from the workshop on other, less standard applications in number theory, as well as topics in number theory with potential applications in science and engineering.

The material is suitable for graduate students and researchers interested in number theory and its applications.

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