

REVIEWS IN GRAPH THEORY

Book Reviews

Reviews in Graph Theory, edited by William G. Brown, American Mathematical Society, 1980. Volumes I, II, III, IV (paperback).

Certainly one of the foremost tasks facing any researcher is to determine what is already known about his problem. This task is particularly difficult in graph theory research as there are many periodicals that publish such work. Of course the American Mathematical Society has been performing a great service for many years by publishing *Mathematical Reviews*. Thus to a large extent this literature search problem has been solved. However if one is specifically interested in graph theory, then one would need all the volumes from the start in 1940 to the present. In addition, one would have to do a great deal of "hunting" to find the references to his problem. William G. Brown has done that job for everyone by publishing a four-volume paperback edition of *Reviews in Graph Theory*, which covers the first 56 volumes of *Mathematical Reviews* (1940-1978). These 7-inch by 10-inch paperbacks are the most handy and useful tools that any graph theorist could own.

Perhaps the content alone of these four volumes explains how worthwhile they are. However, I shall make a few further comments. Clearly the key to the utility of such a compendium is the classification scheme. It becomes obvious by looking at the contents that Brown gave a great deal of thought to the classification process. The entire subject of graph theory is broken down into 27 major categories and 530 subcategories.

These major topics are well chosen and agree with many of the chapter headings that one finds in books on graph theory. Since any two people who tried to compile such a list of major topics would probably arrive at different answers, it seems very foolish to comment on the choice. However, I do think that the choice of categories is excellent. In addition to these graph theory subjects, the four volumes contain a general category which includes books and bibliographies. There is an author index and a subject index. Also it contains a "key" index which gives information on collections, conference proceedings, problem lists, and obituaries. There is an extensive section on "information for the reader" and a form for readers comments.

My own personal experience in using these four volumes during the past few months is that of delight. They have become a very important tool for me, and I recommend that every graph theory researcher own them. Examples abound as to their value. Recently I found the answer to a question that was given as an unsolved problem in one of the famous graph theory books. Since I needed the result for something I was doing, I was very pleased to have found it so easily.

The only fault I could find was the difficulty in learning to use the cross references. For example, in subject category 054 on page 222 of Volume 1 the review numbered 46#5177 refers the reader to an author's related paper only identified as 37#5124. No information is given regarding its location. I had to look in the author index to find that this other work was located in subject category 290. But this is a very minor complaint since I did find what I wanted. In summary, therefore, I would say that these four volumes are very well organized and an indispensable tool. I hope that they will be updated periodically.

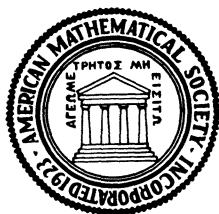
F. T. Boesch

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Automated Theorem Proving: After 25 Years

W. W. Bledsoe and D. W. Loveland, Editors

This volume contains papers based on a special session for automated theorem proving held at the annual meeting of the American Mathematical Society in Denver, January, 1983. At the meeting special awards were given to honor historically significant work (the *Milestone Prize*: Hao Wang, awardee) and to honor excellent current work (the *Current Research prize*: Lawrence Wos and Steven Winker, awardees). Roughly a dozen leading contributors to the field were invited to present papers: papers characterizing their research work or a broader perspective were encouraged. Papers range from a historical overview of twenty-five years of research in the automated theorem proving field to significant technical papers, including a reprint of a *Scientia Sinica* paper giving a new and elegant decision procedure for a portion of elementary geometry.

Most of the major efforts in building automated theorem provers (or theorem proving assistants) are covered by papers in this volume, a notable but less familiar example (to the ATP community) being the Suppes interactive theorem prover for teaching logic and axiomatic set theory. The well-known provers of Andrews, Bledsoe, Boyer and Moore, and Wos, et al. are represented as are term rewriting, combining decision procedures and automating mathematical discovery. The book is intended for every mathematician and computer scientist interested in the state-of-the-art in automated theorem proving, but in particular, it is intended to encourage active research mathematicians to contribute their insight to this field.

Contents

- D. W. Loveland.** *Automated theorem proving: a quarter century review*
Citation to Hao Wang
- Hao Wang.** *Computer theorem proving and artificial intelligence*
Citation to Lawrence Wos and Steven Winker
- L. Wos and S. Winker.** *Open questions solved with the assistance of AURA*
- W. W. Bledsoe.** *Some automatic proofs in analysis*
- R. S. Boyer and J. S. Moore.** *Proof-checking, theorem-proving, and program verification*
- R. S. Boyer and J. S. Moore.** *A mechanical proof of the Turing completeness of pure LISP*
- P. B. Andrews, D. A. Miller, E. L. Cohen and F. Pfenning.** *Automating higher-order logic*
- D. Lankford, G. Butler and B. Brady.** *Abelian group unification algorithms for elementary terms*
- G. Nelson.** *Combining satisfiability procedures by equality sharing*
- Wu Wen-Tsun.** *On the decision problem and the mechanization of theorem-proving in elementary geometry*
- Wu Wen-Tsun.** *Some recent advances in mechanical theorem-proving of geometries*
- Shang-Ching Chou.** *Proving elementary geometry theorems using Wu's algorithm*
- D. B. Lenat.** *Automated theory formation in mathematics*
- J. McDonald and P. Suppes.** *Student use of an interactive theorem prover*

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(Continued from back cover)

J. Lehner and M. Sheingorn , Computing Self-Intersections of Closed Geodesics on Finite-Sheeted Covers of the Modular Surface.....	233
F. Gramain and M. Weber , Computing an Arithmetic Constant Related to the Ring of Gaussian Integers.....	241
Marvin C. Wunderlich , Implementing the Continued Fraction Factoring Algorithm on Parallel Machines.....	251
Masao Kishore , Odd Triperfect Numbers Are Divisible By Eleven Distinct Prime Factors.....	261
J. W. S. Cassels , A Note on the Diophantine Equation $x^3 + y^3 + z^3 = 3$	265
Leo J. Alex , On the Diophantine Equation $1 + 2^a = 3^b 5^c + 2^d 3^e 5^f$	267
Reviews and Descriptions of Tables and Books	279
Gerald and Wheatley 1	
Table Errata	281
Salzer and Levine 605	
Corrigendum	282
Chan	
Supplement to “Gaussian Quadrature Involving Einstein and Fermi Functions With an Application to Summation of Series” by Walter Gautschi and Gradimir V. Milovanović	S1
Supplement to “Computing an Arithmetic Constant Related to The Ring of Gaussian Integers” by F. Gramain and M. Weber	S13

No microfiche supplement in this issue

MATHEMATICS OF COMPUTATION
TABLE OF CONTENTS

January 1985

Stanley Osher, Mohamed Hafez and Woodrow Whitlow, Jr. , Entropy Condition Satisfying Approximations for the Full Potential Equation of Transonic Flow	1
Maria E. Schonbek , Second-Order Conservative Schemes and the Entropy Condition	31
Jim Douglas, Jr. and Jean E. Roberts , Global Estimates for Mixed Methods for Second Order Elliptic Equations	39
A. K. Aziz, R. B. Kellogg and A. B. Stephens , Least Squares Methods for Elliptic Systems.....	53
Christine Bernardi and Geneviève Raugel , Analysis of Some Finite Elements for the Stokes Problem.....	71
Robert E. Scheid, Jr. , Difference Methods for Problems With Different Time Scales	81
Frank de Hoog and Richard Weiss , The Application of Runge-Kutta Schemes to Singular Initial Value Problems	93
Beresford N. Parlett, Derek R. Taylor and Zhishun A. Liu , A Look-Ahead Lanczos Algorithm for Unsymmetric Matrices.....	105
Alden H. Wright , Finding All Solutions to a System of Polynomial Equations	125
L. Pasquini and D. Trigiante , A Globally Convergent Method for Simultaneously Finding Polynomial Roots	135
Richard I. Shrager , A Rapid Robust Rootfinder	151
J. F. Mahoney , Partial Fraction Evaluation and Incomplete Decomposition of a Rational Function Whose Denominator Contains a Repeated Polynomial Factor.....	167
Walter Gautschi and Gradimir V. Milovanović , Gaussian Quadrature Involving Einstein and Fermi Functions With an Application to Summation of Series.....	177
N. I. Ioakimidis , On the Uniform Convergence of Gaussian Quadrature Rules for Cauchy Principal Value Integrals and Their Derivatives	191
N. I. Ioakimidis , Application of Quadrature Rules for Cauchy-Type Integrals to the Generalized Poincaré-Bertrand Formula.....	199
D. J. Newman , A Simplified Version of the Fast Algorithms of Brent and Salamin	207
N. Costa Pereira , Estimates for the Chebyshev Function $\psi(x) - \theta(x)$	211
Tom M. Apostol , Formulas for Higher Derivatives of the Riemann Zeta Function.....	223

(Continued on inside back cover)