

## Automated Theorem Proving: After 25 Years

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

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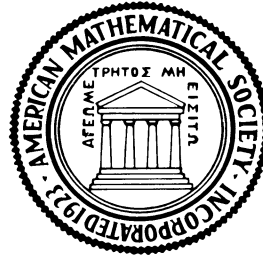
This volume contains papers based on a special session for automated theorem proving held at the annual meeting of the American Mathematical Society in Denver, January, 1983. At the meeting special awards were given to honor historically significant work (the *Milestone Prize*: Hao Wang, awardee) and 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.

- D. W. Loveland.** *Automated theorem proving: a quarter century review*  
*Citation to Hao Wang*
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- D. Lankford, G. Butler and B. Brady.** *Abelian group unification algorithms for elementary terms*
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- J. McDonald and P. Suppes.** *Student use of an interactive theorem prover*

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## Dirichlet Integrals of Type 2 and Their Applications

Milton Sobel, V. R. R. Uppuluri  
and K. Frankowski

(Selected Tables in Mathematical Statistics,  
Volume 9)

### Abstract

This volume deals with incomplete Dirichlet integrals of type 2 and is a companion book to Volume 4 of this series (by the same authors) which deals with incomplete Dirichlet integrals of type 1. As in the previous volume

1) there are several new contributions present, some of which concern the development of new algorithms that made these tables possible.

2) there are many examples given to illustrate the use of the tables.

3) applications of these integrals are given to two types of problems: some that would be classified as being in the area of probability and also to some that are primarily statistical in nature.

4) there is already evidence that these tables and the associated write-up will serve as a catalytic agent for further research.

5) the probabilistic interpretation of the Dirichlet integral plays a major role in the direction we take and in the development of tables.

An important area of application of these integrals is to ranking and selection problems dealing with the multinomial distribution, especially when the statistic of major interest is related to the minimum or maximum frequency among the cells and the stopping rule is of the type used in inverse sampling. In the tables most attention is to the homogeneous multinomial; however much of the analysis attempts to get away from homogeneity.

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## A Dirichlet Problem for Distributions and Specifications for Random Fields

Michael Röckner

(Memoirs of the AMS, Number 324)

Consistent conditional distributions for a large class of Gaussian measures defined on the space of (tempered) distributions on a domain  $D$  in  $\mathbf{R}^d$  are constructed explicitly. The conditional distributions are with respect to an (uncountable) family of  $\sigma$ -fields associated with the complements of the (relatively compact) open subsets of  $D$ . The construction involves solving a Dirichlet problem whose "boundary data" is given by a distribution. Furthermore, the associated set of Gibbs states is studied. The extreme Gibbs states are characterized and it is proved that they have the global Markov property. Based on the Dirichlet solution for distributions it is shown that any Gibbs state can be represented in terms of extreme Gibbs states.

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# Conference on Modern Analysis and Probability (1982, Yale University)

Richard Beals, Anatole Beck, Alexandra Bellow  
and Arshag Hajian, Editors

The Conference in Modern Analysis and Probability in honor of Professor Shizuo Kakutani was held on June 8–11, 1982, at Yale University on the occasion of his retirement. In these Proceedings the papers that were submitted for this Conference are presented. Initial funding was provided by the National Science Foundation.

The three major areas of mathematics on which the Conference focused were functional analysis, probability theory, and ergodic theory. Most of the articles presented were works by the respective authors on problems that were pioneered by Professor Kakutani in the past. Questions in Brownian motion, induced transformations, representation of  $M$ -spaces, and fixed point theorems were discussed.

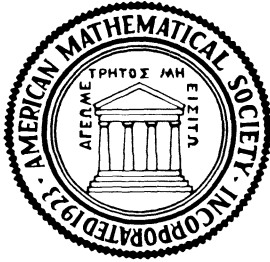
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SIAM-AMS Proceedings  
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## Inverse Problems

D. W. McLaughlin, Editor

Inverse methods are fundamental to most measurement and detection problems in science, engineering, and technology. Such problems arise in diverse areas including tomography in medicine, image reconstruction and enhancement in astronomy, discovering oil deposits and general earth structure in seismology, interpretation of satellite observation, detection of ocean currents, climatology, and many more. A variety of mathematical techniques, with various degrees of sophistication, are used to attack these diverse physical problems which are generally categorized by the necessity of dealing with insufficient and/or inaccurate data of one sort or another.

This volume contains the proceedings of a symposium on inverse methods which was held on April 12 and 13, 1983, in New York City as a part of the sectional meeting of the American Mathematical Society. The organizing committee for the symposium consisted of Robert Burridge, New York University; Joseph B. Keller, Stanford University; R. B. Marr, Brookhaven National Laboratory; David W. McLaughlin (Chairman), University of Arizona; C. R. Smith, University of Wyoming. Their goal in organizing the conference was to illustrate the breadth of modern inverse problems, both with regard to the diversity of applications and the diversity of mathematical methods. From the many possible areas of inverse problems, the organizers chose several topics in which significant theoretical advances have recently been made, yet which have not had a high level of exposure at recent mathematics conferences. The conference consisted of four half-day sessions on the following topics: (i) geophysical inverse problems, (ii) computer tomography and inverse problems in medicine, (iii) developments in mathematical inverse theory, (iv) methods of maximum information entropy. The ordering of papers in this volume is the same as the ordering of presentations at the meeting.

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This directory, published annually, lists key personnel—officers and committee members—of over thirty professional mathematical organizations and of a selected group of government agencies, editors of over 100 journals, over 3,000 heads of academic departments in the mathematical sciences, and heads of the mathematical units in nonacademic organizations. Information includes current addresses (including telephone numbers in many cases), terms of office, and other pertinent information for the organizations represented.

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